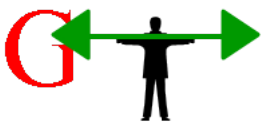


Tana-Beles WME Reports



ORGUT

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No 28: Quarterly Report for period 1.7.2010 – 30.9.2010



Tana-Beles WME - Quarterly Report 30 September 2010 (July – September 2010)

1 Introduction

1 1 Basis of the quarterly report

The quarterly report for July – September 2010 concerns the fifth quarter of the Tana-Beles WME project. The previous quarterly report, for April – June 2010, was published as Tana-Beles WME Report No. 21. It can be [downloaded](#) in the project [web-address](#) (www.tana-beleswme.org)

At the end of September 2010 the Tana-Beles WME – project has been implemented for 16 months. At the end of the month the project has thus been running 31 per cent out of its total duration (16 months of 52 months). Similarly, the main project **Tana-Beles Watershed Development B1** (in which Monitoring & Evaluation is connected) has been running 28 months of total 64 months (44 per cent).

This quarterly report covers the time period July until September 2010, and is based on the [updated WME Work Plan](#). Correspondingly the harmonized component B1 work plan is found in the file “2009 10 14 B1 workplan2009.xls”. Only activities which are indicated within this quarter in the work plan, and extra curricular activities, are discussed in this quarterly report.

The WME TA Team has been on full time duty during this quarter, with the exception of

1. The Team Leader, who has been on sick leave for September 2010. He is expected to resume duties in the second week of October 2010. During his absence, the home office coordinator (Greg Jacobs), supported by the WRMA (Mikaela Kruskopf) have been acting as TL.
2. The first short-term input by the WRMA took place during the fifth quarter, and ended on the 25th August 2010. The WRMA returned to the project for the second short term input, as well as for acting team leader duties, on the 29th September 2010.
3. The accountant of the WME project has been on maternity leave since 23rd August 2010.
4. The M&E expert has been on paternity leave for one week in September

Counterparting staff to the WME TA team members has remained the same as previously, i.e. the WRMA has two counterpart staff members from the BoWRD, and one from the Hydrology Department Bahar Dar office. These staff members have been involved in all project activities throughout the quarter.

1 2 Highlights of the fourth quarter of the WME component



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The main activities during the fifth quarter of the WME have revolved around the three baseline studies. According to the original workplan, the baseline studies were to be started immediately at the WME project start-up. Even this can be considered a late timing for BL studies, since the WME component started nearly a year after the B1 component had started. However, during the first quarter of the WME in 2009 only the hydrological baseline data collection had started (August 2009). The Natural Resources and the Socio Economic baseline studies only got on their way at the end of the fourth quarter, in June 2010, after shifting the responsibility of arrangement of these studies to the WME component in April 2009.

The main bulk of the Natural Resources and Socio Economic baseline studies have been carried out during the fifth quarter. The studies are implemented by the Bahar Dar University, with an international short term consultant peer reviewing the methodologies and analyses.

By the end of the fifth quarter, most of the field work had been carried out by the BDU teams, closely supported and monitored by WME staff members. Field work and progress was discussed during three separate progress meetings between the WME staff, BDU team and the peer reviewer. Several adjustments were made underway, to ensure that all necessary data would be collected. Due to difficult field conditions, the time span of the field work was increased, to allow for proper data collection. Additional field trips were carried out after these meetings, to fill gaps in data. At the end of the fifth quarter, only a few verification trips were remaining for the natural resource study.

Reporting work is underway, and preliminary data analyses have been carried out for both socio economic and natural resources data. Satellite imagery was also purchased through the WME funds, since these were essential for the natural resource baseline study. The reporting of the baseline results is expected to be finalised during the sixth quarter.

The hydrological baseline studies were greatly boosted by the procurement of the Lot 1 hydrological equipments, which was carried out through the WME contingency funds. The equipment arrived in Bahar Dar in the beginning of August. The short term international hydrologist was fielded at the same time, and the equipments were immediately checked, calibrated, training was conducted and equipment installed in the field.

The hydrological equipment Lot 1 includes current meters, which will allow for the measurement of discharge at the hydrological stations. When an adequate number of various water levels have been measured (a minimum of six water levels is required for each station), staff – discharge relationship curves will be developed. Only when each station specific equation has been established with the staff- discharge relationship curve, can the data collected since August 2009 be converted into water and sediment yields. However, since the main rains had passed by the time the current meters arrived, some of the discharge information will have to be collected during the next rainy season. This will delay the conversion of the data, but since the raw data (staff gauge levels and sediment concentrations) has been collected since August 2009, baseline data is secured, albeit only available after adequate discharge data has been collected.

In the Lot 1 also crest stage gauges were purchased and installed at two MMP stations (Station 2 and 11) to test this method of calculating high flow discharges. The method has not been previously used in Ethiopia, and will provide excellent experience for the hydrological monitoring in Ethiopia, where high flow measurements have been problematic due to the extreme flash floods and rapid variations in water level, and the lack of staff to continuously monitor large cableway stations.



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2 Review of the past quarter (Jul – Sep 2010) against Work Plan and Results

2.1 Project management (point 1. in WP)

The Project Management Team (PMT) has continued to meet every Monday (1.2.16). By the end of September 2010 altogether 70 PMT meetings have been held, since the beginning of the project. The PMT meetings have been with the principle of max. one hour duration and one page minutes (to be signed by all the meeting participants).

The Regional Technical Committee (RTC) did not meet during the quarter. However, Regional Steering Committee (RST) met on 19 August to assess the overall performance of the project and endorsed the third year project budget and inclusion of new community watersheds. Based on the RST decisions, project Woredas were engaged with full capacity in planning of new community watersheds since August to include all micro watersheds as part of project beneficiaries.

2.2 Indicator finalization and Baseline studies (Result 1)

2.2.1 Indicator development process (point 2.1)

The indicators developed during the WME work since June 2009 have undergone several adjustments. A final set of indicators were agreed upon during the M&E short term consultant inputs in 2009. However, practice during the B1 component implementation has shown, that some of the indicators were challenging at the Woreda level, where the data from Community Watershed implementation is collected and compiled. The challenges related to e.g. the units in which certain indicator data was collected (being different from those used for reporting). Other challenges related to the splitting of implementation activities between various land types.

As a result of these observations, the WME team has facilitated a revision of output level indicators, including the shifting of certain output level indicators into outcome indicators.

The indicators are shown in Tables 1 – 6. Goal indicators have not been changed.

Table 1. Goal indicators at 30.9.2010

GOAL and DEVELOPMENT OBJECTIVE indicators					30.9.2010
Goal, Object. indicators		Baseline Data at	Status recorded	Description or explanation	Note
#	Code	1.6.2008	31.7.2010		
1	GO1	BL data	n/a	Per capita income growth of 3% to 4% per annum	
2	GO2	BL data	n/a	% of population below poverty line continues to fall by approximately 2.5% -units per ann.	
3	GO3	4000	n/a	Household income rises by 75% in real terms (ETB 4,000 to 7,000 between 2008 and 2018)	
4	DO1	BL data	n/a	80,000 ha of vulnerable Tana sub-basin micro-watersheds rehabilitated and well-managed	
5	DO2	n/a	n/a	Suspended sediment load in targeted watersheds reduced by 10 per cent	
6	DO3	39 %	n/a	% of food insecure households in normal year reduced from 39 % in 2008 to 10 % in 2018	

Notes

n/a data not available yet

Narrative for progress in Goal and Development indicators (Table 1):



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- Most of the indicators rely on baseline data, which will only be available for the situation in June – July 2010 for GO 1,2 and DO 1.
- GO 3 has been set as 4000 at the beginning of the project in 2008
- DO 3 has been set as 39%.
- Baseline data for DO 2 will be available for 12 MMP stations for 2009, and for 15 MMP stations in 2010, when discharge measurements have been carried out and data has been converted to sediment load.

The previous set of outcome indicators listed 19 for B1 (**Table 2**, not updated).

Table 2. OUTCOME indicators					30.6.2010
OUTCOME indicators		Baseline Data at	Status recorded	Description or explanation	
#	Code	1.6.2008	30.6.2010		
1	OC11	BL data	n/a	Improved SWC practices adopted by 30,000 households in targeted kebeles by 2013	
2	OC12	BL data	n/a	Dry season baseflow increased at mini- (1-10 ha) and micro-watershed (1-10 km ²) levels	
3	OC13	BL data	0	10 % households adopting renewable energy innovations by 2013	
4	OC14	BL data	10 ha	All community forests within the targeted watersheds are conserved in their entirety by 2013	
5	OC15	BL data	n/a	Approp. modern and sust. forestry/agroforestry adopted by 75 % of communities in watersheds	
6	OC21	BL data	n/a	Increased production of fruits on 400 SSI sites covering a total of 1,500 ha and increases	
7	OC22	BL data	n/a	Increased production of vegetables on 400 SSI sites of a total of 1,500 ha and increases	
8	OC23	BL data	n/a	Income from crop production increased by 20 per cent between 2008 and 2013	
9	OC24	BL data	n/a	All farmers in targeted watersheds have access to effective agric. extension services by 2013	
10	OC25	0	475	2100 farmers /a trained in FTC's in improved agricult. techniques and technologies by 2013	
11	OC26	BL data	n/a	Incidence of preventable livestock diseases in the targeted watersheds reduced by 85 % by 2013	
12	OC27	BL data	n/a	Value of livestock & livestock products sales increased by 20 % in targeted watersheds by 2013	
13	OC31	BL data	n/a	20 % households adopting more efficient and appropriate processing technologies by 2013	
14	OC32	BL data	n/a	A group, or No of individual fuel efficient stove production enterprises established by 2013	
15	OC33	BL data	n/a	No. households engaged in off-farm enterprises in targeted watersheds increased by 35 % by 2013	
16	OC41	BL data	n/a	Reduced transport costs for markets and inputs in targeted kebeles by 2013	
17	OC42	BL data	n/a	Improved access to markets, inputs and social services in targeted kebeles by 2013	
18	OC43	BL data	n/a	Improved access to educational and health services / facilities in targeted kebeles by 2013	
19	OC44	41 %	n/a	Access to potable water in targeted kebeles increased from 41 % in 2008 to 80 % by 2013	

The revised list of outcome indicators includes a number of indicators shifted up from output indicators (Table 3), being now at 26.



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Table 3. OUTCOME indicators 30.9.2010

OUTCOME indicators		Baseline Data at 1.6.2008	Status recorded 30.9.2010	Description or explanation	Note
#	Code				
1	OC11	BL data	n/a	Improved SWC practices adopted by 30,000 households in targeted kebeles by 2013	
2	OC12	BL data	n/a	Dry season baseflow increased at mini- (1-10 ha) and micro-watershed (1-10 km2) levels	1
3	OC13	BL data	0	10 % households adopting renewable energy innovations by 2013	
4	OC14	BL data	10 ha	All community forests within the targeted watersheds are conserved in their entirety by 2013	
5	OC15	BL data	n/a	Appropri. modern and sust. forestry/agroforestry adopted by 75 % of communities in watersheds	
6	OC21	BL data	n/a	Increased production of fruits on 400 SSI sites covering a total of 1,500 ha and increases	
7	OC22	BL data	n/a	Increased production of vegetables on 400 SSI sites of a total of 1,500 ha and increases	
8	OC23	BL data	n/a	Income from crop production increased by 20 per cent between 2008 and 2013	
9	OC24	BL data	n/a	All farmers in targeted watersheds have access to effective agric. extension services by 2013	
10	OC26	BL data	n/a	Incidence of preventable livestock diseases in the targeted watersheds reduced by 85 % by 2013	
11	OC27	BL data	n/a	Value of livestock & livestock products sales increased by 20 % in targeted watersheds by 2013	
12	OC31	BL data	n/a	20 % households adopting more efficient and appropriate processing technologies by 2013	
13	OC32	BL data	n/a	A group, or No of individual fuel efficient stove production enterprises established by 2013	
14	OC33	BL data	n/a	No. households engaged in off-farm enterprises in targeted watersheds increased by 35 % by 2013	
15	OC41	BL data	n/a	Reduced transport costs for markets and inputs in targeted kebeles by 2013	
16	OC42	BL data	n/a	Improved access to markets, inputs and social services in targeted kebeles by 2013	
17	OC43	BL data	n/a	Improved access to educational and health services / facilities in targeted kebeles by 2013	
18	OC44	41 %	n/a	Access to potable water in targeted kebeles increased from 41 % in 2008 to 80 % by 2013	
19	OP221	1 460	1 504	Average yields for cereals increased by at least 25 % by 2013	
20	OP222	BL data	n/a	Average yields for oilseeds increased by at least 25 % by 2013	
21	OP223	1 041	1 073	Average yields for pulses increased by at least 25 % by 2013	
22	OP224	BL data	n/a	Average yields for horticultural crops increased by at least 25 % by 2013	
23	OP128	0	0	Sust. hydrol. monit. system established, functioning, providing timely and accurate data by 2010	
24	OP241	BL data	n/a	30 % increase in quantity of crop produce reaching market in targeted kebeles by 2013	
25	OP262	0	n/a	Livestock extension services improved in all targeted kebeles by 2013	
26	OP282	BL data	n/a	Livestock productivity increased by 25 % by 2013	

Notes

n/a data not available yet

1 Data from B1 3rd quarter physical achievements (May 2010)

Narrative for progress in Outcome indicators (Table 3):

- Line 2, OC12. Baseline data is available for 12 microwatershed level stations during dry season 2009 – 2010, and will be available for 15 MMP stations for dry season 2010 – 2011 if MMP programme is continued. Miniwatershed level is proposed to be removed from the indicator description since monitoring has not taken place at this level, and replaced by subwatershed level, at which monitoring is planned to start in 2011. The dry season base flow will be reported separately in the 2010 MMP report, spanning the entire year.
- Line 10, OC14. 254 ha community forests have been conserved in Sekela Woreda (Report: MIS database). The total area (ha) of community forests in the Tana-Beles project area (out of 80,000 ha) is to be found out by the Natural resource baseline survey.
- Line 19 and 21, OC25. Baseline data currently drawn from the Ethiopian Central Statistical Agency reports, giving yields of South Gondar and West Gojam Zonal average for 1993-2009. It is expected that the NRM and Socio Economic Baseline studies will bring a more specific number, to report the baseline situation at Woreda level, and for 2008.



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- *Line 23. At the baseline no hydrological monitoring programmes were operative in the project area, with the exception of two stations operated by the MoWR hydrological department, Fogeda and Upper Ribb. However, little or no sediment information is collected at these stations. Currently (October 2010) microwatershed level monitoring has been established at 15 stations, providing timely and accurate data. The nr of stations is higher than originally planned. However, at subwatershed level only preliminary planning has taken place. Therefore it could be considered that approximately 60% of this indicator is currently achieved.*
- *No other status data is available by 30.9.2010*

The output indicators for B2 have undergone a revision. The revision is based on a splitting of the indicators into

1. indicators that can be currently captured through the reporting format that is used at Woreda level.
2. Indicators that will require separate yearly surveys. These are e.g. average yield information of various crops (oilseeds, pulses, cereals, horticultural crops).

Table 4 presents the previous set of indicators (as presented in the fourth Quarterly Report), while Table 5 presents a revised set of 31 output indicators. Table 6 presents the main motivations for the changes proposed. Note, that this is a draft revision, which will be tested during the next quarter.



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Table 4. OUTPUT indicators					31.7.2010
Output indicators		Baseline Data at	Status recorded	Description or explanation	Note
#	Code	1.6.2008	31.7.2010		
1	OP111	BL data	41	CBPWDP's and CAP's prepared for all (163) community watersheds in project area by 2013	1
2	OP121	BL data	40,5	452 ha of gullies rehabilitated by 2013	
3	OP122	BL data	n/a	50 per cent of streams and seasonal rivers in the targeted catchments rehabilitated by 2013	
4	OP123	BL data	6298	SWC measures implemented on 53,285 ha of cultivated land by 2013	2
5	OP124	BL data	935	SWC measures implemented on 19,667 ha of grazing land by 2013	2
6	OP125	BL data	n/a	SWC measures implemented on 5,669 ha of degraded land by 2013	
7	OP126	BL data	n/a	SWC measures implemented on 1,220 ha of forestry land by 2013	
8	OP127	BL data	n/a	SWC measures implemented on 309 ha of mixed use land by 2013	
9	OP128	0	0	Sust. hydrol. monit. system established, functioning, providing timely and accurate data by 2010	
10	OP131	BL data	n/a	User groups & mgmt plans made for forest conserv, in 75 % of comm watersheds. by 2013	
11	OP141	BL data	625	20 tree nurseries established by 2013 to supply communities and households by 2013	
12	OP142	0	125	3,000 ha of community forests planted by 2013	
13	OP143	0	804	2,000 ha household woodlots planted by 2013	3
14	OP151	BL data	1294	Fuel efficient stoves adopted by 50 % of households (35,200) in 163 watersheds by 2013	
15	OP152	BL data	n/a	Renewable energy innovations adopted by 10 % of households by 2013	
16	OP161	0	4	DA's in NR offices of targeted kebeles (35) provided with equipm. and motorcycles by 2010	
17	OP211	0	6	Farmers Training Centres upgraded / rehabilitated in all 35 targeted kebeles by 2013	
18	OP221	1 460	1 504	Average yields for cereals increased by at least 25 % by 2013	
19	OP222	BL data	n/a	Average yields for oilseeds increased by at least 25 % by 2013	
20	OP223	1 041	1 073	Average yields for pulses increased by at least 25 % by 2013	
21	OP224	BL data	n/a	Average yields for horticultural crops increased by at least 25 % by 2013	
22	OP231	0	40	1500 ha of Small Scale Irrigation established by 2013	
23	OP241	BL data	n/a	30 % increase in quantity of crop produce reaching market in targeted kebeles by 2013	
24	OP251	0	4	DA's Crops & Livestock in 35 kebeles provided with furnit., equipm., motorcycles by 2010	
25	OP261	0	14	Veterinary services improved and constructed in all 35 targeted kebeles by 2013	
26	OP262	0	n/a	Livestock extension services improved in all targeted kebeles by 2013	
27	OP271	BL data	n/a	25 % of households have adopted improved fodder production by 2013	
28	OP272	BL data	n/a	20 % of households have adopted controlled grazing and stall feeding by 2013	
29	OP281	BL data	n/a	10 % of households have adopted improved animal breeds by 2013	
30	OP282	BL data	n/a	Livestock productivity increased by 25 % by 2013	
31	OP311	0	n/a	One fully functioning flour mill established in each targeted kebele by 2013	
32	OP321	BL data	n/a	Approp. farm production, processing & transp. equipm. promot. / demonstr. in targeted kebeles	
33	OP322	BL data	n/a	Modern charcoal and carbonisation kilns produced in 10 % of communities in watersheds by 2013	
34	OP323	BL data	n/a	Fuel efficient stoves produced in 35 targeted kebeles by 2013	4
35	OP411	BL data	5	10% households establish. water harvest. struct, microponds, hand dug wells, hand pumps by 2013	
36	OP412	BL data	26	657 springs or handdug wells developed by 2013	
37	OP413	BL data	1294	166 improved sanitation units provided in targeted 35 kebeles by 2013	
38	OP421	BL data	34	Primary education and health services or facilities in 35 targeted kebeles supported	5
39	OP431	BL data	14	135 km of access roads constructed or upgraded by end of project in 2013	
40	OP432	BL data	15	192 km of internal access paths constructed or upgraded by 2013	
41	OP433	BL data	4	232 footbridges / culverts constructed by 2013	
42	OP434	BL data	2	Telephone posts established in 35 targeted kebeles by 2013	



Table 5. OUTPUT Indicators

No.	Output Indicators Code	Baseline Data at 16 2008	Status recorded 30 9 2010	%	Description or explanation
1	OP111	BL data	54,00	33,33	CBPWDP's and CAP's prepared for all(163) community watersheds in project area by 2013
2	OP121	BL data	40,42	0,81	452 ha of gullies rehabilitated by 2013
3	OP123	BL data	6 298,00	11,73	SWC measures implemented on 53,285 ha of cultivated land by 2013
4	OP125	BL data	935,00	3,48	26865 ha of Degraded land (hillside, communal grazing land and forestry land) treated
5	OP131	BL data	0,00	0,00	User groups & management plans made for forest conservation in 75% of comm. Watersheds by 2013
6	OP141	BL data	26,00	130,00	20 tree nurseries established by 2013 to supply communities and households by 2013
7	OP142	0	254,00	8,47	3000 ha of community forests planted by 2013
8	OP143	0	820,00	41,00	2000 ha household woodlots planted by 2013
9	OP151	BL data	1 294,00	3,68	Fuel efficient stoves adopted by 50% of households in the targeted watersheds by 2013
10	OP152	BL data	0,00	0,00	Renewable energy innovations adopted by 10% of household by 2013
11	OP161	0	4,00	11,43	DA's in NR offices of targeted kebeles provided with equipment by 2010
12	OP211	0	9,00	25,71	Farmers Training Centers Upgraded /rehabilitated in all 35 targeted kebeles by 2013
13	OP231	0	40,00	2,67	1500 ha of Small Scale Irrigation established by 2013
14	OP251	0	0,00	0,00	DA's in targeted kebeles provided with motorcycles by 2013
15	OP261	0	4,00	11,43	Veterinary services improved in all 35 targeted kebeles by 2013
16	OP271	0	0,00	0,00	25% of households have adopted improved fodder production by 2013
17	OP272	BL data	0,00	0,00	20% of households have adopted controlled grazing and/or stall feeding by 2013
18	OP281	BL data	0,00	0,00	10% of households have adopted improved animal breeds by 2013
19	OP311	BL data	0,00	0,00	One fully functioning flour mill established in each targeted kebele by 2013
20	OP321	0	0,00	0,00	Approp. farm production, processing & trans. equipment promoted/demonstrated in targeted kebele
21	OP322	BL data	0,00	0,00	Modern charcoal and carbonisation kilns produced in 10% of communities in watersheds by 2013
22	OP323	BL data	0,00	0,00	Fuel efficient stoves produced in 35 targeted kebeles by 2013
23	OP411	BL data	5,00	0,07	10% households establish water harvest structure, micropond, hand-dug wells, hand pumps by 2013
24	OP412	BL data	27,00	4,10	657 springs or hand pumps developed by 2013
25	OP413	BL data	19,00	10,67	166 improved sanitation units provided in targeted kebeles by 2013
26	OP421	BL data	68,00	97,14	Primary education and health services or facilities in 35 targeted kebeles supported
27	OP431	BL data	1,05	0,78	135 km of access roads constructed or upgraded by end of project in 2013
28	OP432	BL data	15,00	7,81	192 km of internal access paths constructed or upgraded by 2013
29	OP433	BL data	4,00	1,72	232 footbridges / culverts constructed by 2013
30	OP434	BL data	2,00	5,71	Telephone posts established in 35 targeted kebeles by 2013
31	OC25	BL data	475,00	22,62	2100 Farmers trained in FTC's in improved agriculture techniques & technologies by 2013

From Table 5 it can be seen that some of the entry point outputs are nearly completed. The establishment of tree nurseries has exceeded the expectations. However, most of the indicators are severely behind schedule, if compared to the elapsed time (44%).

The new output indicators are linked directly to the MIS system. If each woreda delivers a timely and complete data as expected, the output indicator reports can be directly generated from the MIS application.

The outcome and goal level indicators can be generated yearly by collecting secondary data from kebeles and by primary data collected through conducting household survey.

Most indicators are awaiting baseline data from the currently ongoing natural resources and socio-economic baseline studies.



Table 6. Revised output indicators, and the reason for the changes.

No	Previous Output	New Output	Change made and Reason for change
1	452 ha of gullies rehabilitated by 2013	452 ha of gullies rehabilitated by 2013	The previous two output indicators are merged in to one. b/c both in the baseline study and in reporting format these two indicators are treated as one output indicator
2	50 per cent of streams and seasonal rivers in the targeted catchments rehabilitated by 2013		
3	SWC measures implemented on 19,667 ha of grazing land by 2013	Degraded land (hillside, communal grazing land and forestry land) treated	The previous four output indicators are merged in to one, since in the Woreda reporting format these four indicators are treated as one output indicator. The assumption of aggregating these four output indicator in to one output indicator is to minimize the disaggregation of activities and to reduce the complexity of the reporting format
4	SWC measures implemented on 5,669 ha of degraded land by 2013		
5	SWC measures implemented on 1,220 ha of forestry land by 2013		
6	SWC measures implemented on 309 ha of mixed use land by 2013		
7	Sust. hydrol. monit. system established, functioning, providing timely and accurate data by 2010		Changed to an outcome indicator. b/c the establishment of hydrological monitoring stations can be an output indicator but as a system establishment it could be an outcome level indicator. At output level this could be simplified to “MMP hydrological monitoring operative” and checked by monthly reporting from BoWRD counterparts responsible for the continuation of the MMP data collection, input and analyses.
8	30 % increase in quantity of crop produce reaching market in targeted kebeles by 2013		Changed to an outcome indicator. This indicator is the outcome of increase in crop production and access road output indicators, so it better to consider this indicator as an outcome indicator.
9	Livestock extension services improved in all targeted kebeles by 2013		Changed to an outcome indicator. This indicator is the result of other many output indicators, such as improving veterinary services institutions, improving veterinary technicians, livestock demonstrations.
10	Livestock productivity increased by 25 % by 2013		Changed to an outcome indicator. This indicator is the result of other many output indicators, such as improving animal breeds, improving veterinary services, livestock demonstrations, improving fodder.
11	2100 farmers trained in FTC's in improved agricultural. techniques and technologies by 2013 (outcome indicator)	2100 farmers trained in FTC's in improved agricultural. techniques and technologies by 2013	Changed to an output indicator. b/c the stated indicator shows only getting training not attitude change on farmers so it can be treated as output indicator.

Similarly to output and other indicators a table for the status of **input indicators** can be drawn (**Table 7**). The major inputs for the Watershed Development B1 are, according to the PAD: (a) total of 35.08 million USD through World Bank and farmers' in-kind contribution, including total of 3.5



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million EURO as a grant through a World Bank operated Trust Fund (grant from Finland), and (b) 1.5 mill. EURO through Government of Finland for bilateral contribution in Watershed Monitoring & Evaluation.

The baseline data in this case is known: zero at the beginning of the project. The status data are based on the reported financial data as per 30.9.2010.

Table 7. Input indicators

INPUT indicators				30.9.2010	
Input indicators		Baseline Data at	Status recorded	Description or explanation	Note
#	Code	1.6.2008	30.9.2010		
1	IN01	0	14,7	Component B1 reported transfer of funds from project start until 30 Sept. 2010, in mill. Eth Birr	1
2	IN02	0	0,9	Watershed development B1 transfer of funds until 30 Sept. 2010, in mill. USD (exch rate 13,53)	
3	IN03	0	10,4	Farmers' input Watershed development B1, in kind, in mill. Eth Birr, until 30 September 2010	2
4	IN04	0	0,6	Farmers' input Watershed development B1, in kind, in mill. USD (exch rate 13,53) (by 30.9.2010)	
5	Tot M\$	0	1,5	35.08 mill USD for total input for Watershed Development B1 during 1.6.2008 - 30.9.2013	3
6	IN06	0	0,7	Tana-Beles Watershed Monitoring & Evaluation bilateral component (WME) (by 31.7.2010)	4
7	TOT M€	0	0,7	1.5 mill Euro for total input for Tana-Beles WME during 1.6.2009 - 30.9.2013 (52 months)	

Notes	1	First 300 000 Birr transferred in Feb 2009, second 6 719 547 in July 2009, and third 7 633 150 Birr in March 2010, totalling 14 652 697 Birr of that 7 646 538 Birr was used by 30.9.2010, or 52,2%			
	2	Farmers input in kind estimated at 10 316 Birr according to information reported through the M&E system from Woredas			
	3	Total of IN02 + IN04 ("cash + in kind") =	1,537 mill USD =	4,38 per cent	
	4	As per WME Financial report on 30.9.2010	726 648 Eur	48,4 per cent	

Narrative for progress in Table 7.

- Line 1, IN01. 300,000 Birr transferred in Feb 2009; 6,719,547 Birr in July 2009; 7,633,150 Birr in March 2010, total 14.653 mill. No new transfers have been made since the funds have not been depleted yet.
- Line 2, IN02. 14.7 mill. Eth Birr converted into USD with exchange rate 16,279; totals 0.9 mill. USD
- Line 3, IN03. Farmers' "in-kind" inputs estimated by participating Woredas through M&E reporting system 30.9.2010.
- Line 4, IN04. 10361 mill. Eth Birr converted into USD with exchange rate 13.53; totals 0.6 mill. USD
- Line 5. Tot M\$. Total of Line 2 + Line 4 = 1,615 mill. USD (makes 4.6 per cent of 35.08 mill. USD).
- Line 6, IN05. Data based on financial reporting on occurred expenses on 30.9.2010.
- Line 7. Total of Line 6 = 0.727 mill. Euro (makes 48.4 per cent of 1.5 mill. Euro).



2.2.2 Hydrological baseline studies (point 2.2)

2.2.2.1 Microwatershed Monitoring Programme (MMP)

Hydrological baseline studies were continued through the Microwatershed Monitoring Programme during the fifth quarter, through routine collection of rainfall, Secchi turbidity, water level and sediment concentration data (activities 2.2.4, 2.2.13 and 2.2.14). The number of sediment samples collected during the fifth quarter was 2516 (monthly data collected is indicated in **Table 8**). The number of staff level, secchi and rain measurements is far higher, since these parameters are measured at minimum twice a day at each station (minimum number of data $2 \times 90 \times 17 = 3060$ data). Additionally 25 rain gauges have been installed, data being collected twice daily (minimum nr of observations $2 \times 90 \times 25 = 4500$). This data will be analysed at the beginning of 2011, when all data for 2010 has been collected, punched in, cleaned, quality controlled and analysed.

Table 8. Number of sediment samples collected from 15 MMP stations, and subsequently analysed for sediment concentration in the Soil Laboratory or BoARD, during the quarter.

		2010	2010	2010	2010	2010	2010	2010
STATION		June	July	Aug	Sep	Oct	Nov	Dec
1	Tikkur Wuha	48	66	63				
2	Guale	55	121	139				
3	Washaw	18	22	21				
4	Mowalele	31	48	32				
5	Deledel	20	36	50				
6	Genametwecha	48	70	58				
7	Enkulal	53	71	65				
8	Shimagele Giorgis	42	72	74				
9	Toma	54	67	55				
10	Boza	47	50	51				
11	Dabzuit	105	120	101				
12	Agezo	33	63	46				
13	Fogeda	50	71	58				
14	Agar	52	59	42				
15	Worka	8	16	45				
SUM		664	952	900				

Installation of additional equipment (“upgrading” 2.2.16) could finally commence during the fifth quarter, after the Lot 1 equipments arrived. The activities included:

- Installation of pressure transducers, measuring water level at 20 minute intervals, at MMP stations 2 and 11
- Installation of crest stage gauges, enabling estimation of high flow discharges, at MMP stations 2 and 11
- Start of discharge measurements at MMP stations using the SEBA current meters purchased. During the fifth quarter current meter measurements were made on stations 2 and 11 only



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- Start of discharge weighted sediment samples at MMP stations, using the DH 48 sediment sampler. During the fifth quarter current meter measurements were made on stations 2 and 11 only

Extensive training was also given for all equipment purchased, both in the office and in the field. Training in the use of the HYDATA database was given at BoWRD premises in Bahar Dar, as well as in the Hydrology Department in Addis Abeba, as private tuition to database responsible staff members. A list of trainees is given in Annex 1

The short term consultant in Hydrology (2.2.1) had his second input during the fifth quarter. This input had been postponed, to ensure that it coincided with the delayed arrival of the equipment. Apart from equipment testing, calibration, training and installation work, two main outputs were prepared in collaboration with the WRMA; a consultancy report including various annexes, and a Guideline for the MMP stations, as part of the hydrology exit strategy. The Guideline will be further tested and amended by the WRMA during the sixth quarter. The draft manual can be found as Annex 2.

The STC report has been submitted to the RPCU during the fifth quarter (September 2010) and will be finalised as soon as comments have been received. The report includes an updated Subwatershed Outlet report, the draft of which is annexed to this quarterly report (Annex 3). The subwatershed report summarises the final findings of the short term consultancy for Access Road Costing (published on the tana-beleswme webpage as WME Report 24), with updated tables of equipments, quantities, total costs and budgets for the establishment of subwatershed outlet hydrological monitoring stations. The report recommends three subwatershed outlets to be constructed by the B1 component, namely the Baskura, Enkulal and Jema outlets.

Relating to activity **2.2.10 Conduct training in Woredas and Kebeles ...**, training was given in the field also to Woreda Water Office staff members. The BoWRD has expressed a wish to include the water offices in the running of the MMP, in order to ensure feasibility and sustainability of the programme. In this regard, a capacity assessment of the Woreda Water Offices in the five participant Woredas was carried out at the end of the quarter, but the analysis was not yet finalised by end of September 2010.

2 2 2 2 Subwatershed Outlet Hydrological Monitoring.

The construction of riverbank gauging stations at subwatershed outlet level (2.2.3) had been foreseen to take place during the dry season of 2010. However, due to the remoteness of the outlets, more studies and activities were required before proceeding to this activity. These include

- Consultation by the national short term expert to conduct an Access Road Costing study to each of the five subwatershed outlets was finalised during this quarter (the final report published on the tana-beleswme webpage as WME report 24).
- Purchase of instrumentation serving the subwatershed outlets, including a sediment sampler for the suspended sediment collection from bridges and cableways, staff gauges, crest stage gauges, as well as three pressure transducers, cables, and protective enclosures for stilling wells to be constructed at the subwatershed outlets by the hydrology department. Road construction and riverbank gauging systems (Cableways) for subwatershed outlets remain in the Lots to be processed by the NPCU, and the finalisation of these activities is pending.



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- Contacting the A1 component, which was fielded, and is implemented by the French consultant BRL. The team members were contacted by the WRMA, and the A1 hydrologist (Rob van der Weerd) has been taken to Baskura and Kentay outlets, and the coordination of the duties has been discussed. The Team Leader, Ms Carole Corneille, has also been contacted and met for discussions between the WRMA and the short term hydrologist. The overall project coordinator Mr Verdonck has also been contacted to coordinate the inputs and efforts.
- Contacting the Ghent (Belgium) and Bahar Dar Universities PhD project will include the Kentay outlet station, and collaboration and data sharing has been agreed upon with this project to maximise the benefits of the various projects for data collection and analyses.

The activity 2.2.4 – *collection of data at subwatershed outlet level* – is delayed and will only take place when the subwatershed outlet access roads and monitoring sites are constructed.

2 2 3 Natural resources baseline study (point 2.3)

Outsourcing, contract negotiations and contracting of the Bahir Dar University to implement the combined study has taken a lot of time and effort of the WME component. The fieldwork started on 21st of June, 2010. The TA Team has been much involved in the field work for the combined survey with the team of experts from BDU. Eight university lecturers or other professionals were mobilized for the field and have conducted extensive training sessions for data collectors.

The implementation started at the beginning of the rainy season in June 2010, which was a challenge for the field work, but on the other hand also gives a good impression of the massive impacts of the rainy season on the soil loss. A number of field visits to the respective project Woredas have been done by BDU. For the natural resources, the Spot 5 Satellite imagery has been acquired by the WME component, and is being used for the baseline study.

For quality control reasons, a series of joint review meetings and field verification visits made by the TA team were carried out, including guiding and supervising the BDU survey team in all of the project woredas. The review meetings included RPCU. This enabled the identification of gaps in the work undertaken, and in collaboration improvements and solutions were sought. The initial orientation provided to the survey crew involved on the NR and socio-economy was found to be weak and thus additional recruitment and orientation was necessary. The training of the enumerators/field crew in the use of GPS and biophysical data collection was supported by the WME TA team. The survey work, however, was not without challenges. As related to the wet and rainy season it was especially difficult to run the NR baseline survey in terms of crossing and accessing some of the survey sites. Because of this the total time taken to collect field data was longer than originally anticipated. Since high resolution Quick Bird Satellite imagery was not available (due to high cost), significant additional field work was required, further increasing the time needed in the field.

Presently, except some field verification activities on woody biomass and land use, most of the fieldwork has been completed. Currently BDU are doing the data encoding, cleaning and analysis work.

The **peer reviewer** (Dr. Assefa Melesse from University of Florida) came to Amhara for his second mission input, 15th July to 2nd of August, 2010 (19 days). The Peer Reviewer joined the survey team in the field on his second mission. He has completed two inputs and delivered a progress report,



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which was circulated for comments to RPCU. His third input will be made when the BDU has delivered a first draft report (expected in the beginning of November). By then, all the baseline information for the set indicators (goal/development objectives, outcomes and output) are expected to be determined.

2 2 4 Socio-economic baseline study – primary information collection (point 2.4)

Combined with Natural Resources baseline survey (see Chapter 2.2.3).

3 Monitoring and evaluation subsystems (point 3)

3 1 Designing M & E system (point 3.1)

3.1.16 Include all information from the studies into databases

The Combined survey by Bahir Dar University is ongoing and most of the data's are in data cleaning stage. Inclusion in the database will be carried out by the TA team after data has been reviewed and approved by TA Team and RPCU. The necessary preparations, such as the design of geodatabase, is finished and some data such as SPOT 10 multispectral and SPOT 5 panchromatic images of the watersheds are included into the database.

The TA component has furnished the combined study with most of the data and the software, such as ASTER30m DEM, maps of community watersheds, regional and kebele data, ERDAS 9.2 software for image processing and ArcView 3.2 extensions which are used to download the Google earth images and to delineate watershed boundaries.

3 2 BoARD implementing M & E systems and MIS (point 3.2)

Support BoARD/Woredas/Kebeles with information processing and producing feed back to stakeholders and beneficiaries (3.2.5).

At the end of August 2010 a meeting took place on how to strengthen the data flow from project Woredas. There was insufficient data flow from project Woredas. For example no data had arrived to the GISA for the compilation of the computerized database and MIS except from Farta Woreda. The reasons were found to be the following:

1. Lack of attention and dedication both from community facilitators and woreda experts in collecting timely reports from community level and updating the database. The Bureau level must put in much effort in requiring the data, in order to acquire the monthly reports.
2. In most cases the woreda and kebele agriculture office experts are busy in yearly scheduled tasks. Therefore they forget or ignore to collect and process the monthly report.
3. There is a tendency to continue in old way of reporting. When the Woreda staff are busy in some other routine tasks they send a report in simple paper without entering the data in to a database. The nature of databases is, that they aggregate the data and accumulates the achievements of each activity over the project life time, so if some data missed the project achievement will reduce by that omitted data.
4. In August and September little B1 activities took place in the field, and therefore reporting was ignored.
5. Output level reporting is lacking. In most cases Woredas send activity level reports only.



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6. Computers were out of order in some Woredas such as Mecha,
7. Different versions of reporting formats were arriving at the Woredas
8. Deployment of all WWT members for the recently launched watershed planning in the field (Dera Woreda),
9. Lack of division of responsibilities between DAs and CDFs which has caused some report fallacy and back and forth in the flow of hard data from community watersheds to KAs and Woredas.

Having thoroughly discussed the above problems RPCU and WME TA Team have agreed to jointly move to all project Woredas, by the end of the completion of the present planning exercise, to resolve the challenges faced. It was basically agreed that the monthly report should reach the regional database, in soft copy CD-Rom, by 5th date of the next month – Ethiopian Calendar. Due to frequent staff turnover both at the KA and Woreda levels the need of organizing refreshment training in the form of training of trainers has been discussed.

Due to the above reasons, at the Regional level there are still problems in updating the indicator lists. Currently, it would have been possible to get indicator status directly from the MIS database so this database should be updated on monthly bases. A monthly visit to each Woreda by the M&E staff seems necessary to try to encourage the information flow.

Support BoARD/woredas in the use of established baseline studies for monitoring (3.2.8)

Relating to the hydrological baseline studies, the assigned BoWRD counterparts have participated in all parts of the hydrological work during the fifth quarter. A guideline for the operation of the MMP stations has been developed (Annex 2) and is being tested. The MMP Baseline Report (WME Report 20) sets an example for the basic data analyses, to be repeated after 2010 data is complete.

Technical advice and monitoring support to BoARD for annual CAPs and budgets (3.2.9) – related to (3.2.7) Support BoARD/woredas/kebeles in future planning and management of its Action Plans utilizing the M&E systems.

From 25-26 August 2010, a two-day training was organized at Farta Woreda for the Woreda Watershed Team, Kebele level supervisors, DAs, community facilitators and Key Kebele level leaders. All in all the participants were about 200. The GIS Advisor and CBNA have participated on the training by providing pertinent tools in the preparation of community watershed plans. The objective is to speed up the remaining $162-19 = 143$ community watershed planning. This is a task target set by the B1 component (in the revised logframe) i.e. completion of all CBPWDPs/CAPs as early as possible. In this respect 82 community watershed plans are to be prepared in Farta Woreda alone (75 CWs in the rural kebeles of Farta Woreda and 7 from urban kebeles of Debre Tabor town). For speeding up the planning process 6-11 technical working teams have been established, received orientation/training and have already been deployed in the field. On the job technical assistance of the WME TA Team has also been called for. This kind of speedy planning was initiated after the regional steering committee passed a strong directive to the project zones and woredas. The effort has also started in Dera, Estie, Sekela, and Mecha Woredas and will be continued until the end of October (2003 E.C).

The findings from these evaluations is presented in Table 9

Table 9. Summary of status of Community Watershed Planning in the visited Woredas.



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No.	CWS	Status	CWS Team	
			M	F
Fareta Woreda				
1	Tikure Bahir	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
2	Roman	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
3	Asan hoye	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
4	Tach Keha	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
5	Bayita	- Planning phase is finished and approved by community. - Paper work is in progress	8	4
6	Gosie	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
7	Amiba Sar	- Planning phase is finished but not approved by community. - Paper work is in progress	6	6
8	Bereberie Wonz	- Planning phase is finished but not approved by community. - Paper work is finished	8	4
9	Gideba	- Planning phase is finished but not approved by community. - Paper work is finished	8	4
10	Dindye	- Planning phase is finished but not approved by community. - Paper work is finished	8	4
11	Tebasuit	- Planning phase is finished but not approved by community. - Paper work is finished	8	8
12	Bire Wedeb	- Planning phase is finished and approved by community. - Paper work is in progress	7	5
13	Kombelie	- Planning phase is finished and approved by community. - Paper work is in progress	7	5
14	Chimchimit	- Planning phase is finished and approved by community. - Paper work is in progress	8	4



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15	Aleket Wonz	- Planning phase is finished and approved by community. - Paper work is in progress	3	9
16	Gogebie	- Planning phase is finished but not approved by community. - Paper work is finished	8	4
17	Beringa	- Planning phase is finished but not approved by community. - Paper work is finished	8	4
18	Awerajit	- Planning phase is finished and approved by community. - Paper work is finished	8	4
19	Debere Genet	- Planning phase is finished but not approved by community. - Paper work is finished	8	4
20	Asika Guna Guna	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
21	Shenkore Mesk	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
22	Dereq Hara	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
23	Qesegie K/Mhired	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
24	Shembekoch	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
25	Goder	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
26	Ayeqwa	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
27	Dengorse	- Planning phase is finished but not approved by community. - Paper work is in progress	8	4
Dera Woreda				
1	Fogeda Gelawdios	- Planning phase is finished and approved by community. - Paper work is almost finished	14	4
2	Qega Weha	- Planning phase is finished and approved by community. - Paper work is almost finished	9	5



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3	Shiberila	- Planning phase is finished and approved by community. - Paper work is almost finished	9	5
4	Fogeda	- Planning phase is finished and approved by community. - Paper work is almost finished	8	4
Sekela				
1	Tach Guder	- Planning phase is finished and approved by community. - Paper work is almost finished	8	4
2	Widebe	- Planning phase is finished and approved by community. - Paper work is almost finished	10	5
3	??	- Planning phase is finished and approved by community. - Paper work is almost finished		
Debre Tabor Town				
1	Lay Ach	- Planning phase is in progress - Paper work is in progress	7	6
2	K/mhired	- Planning phase is in progress - Paper work is in progress	8	5
3	Zanti	- Planning phase is in progress - Paper work is in progress	7	6
4	Suray	- Planning phase is in progress - Paper work is in progress	6	6
East Estie				
1	Gumara Six	Field work is finished and paper work is in progress		
2	Teleku Senbetie	Field work is finished and paper work is in progress	6	5
3	Gumara Four	Field work is in progress		
4	Gumara Five	Field work is in progress		

Technical advice in conducting Data Quality Assessments (3.2.11). A data quality assessment guideline is prepared by the TA team. Based on this guideline technical advice has been given for community facilitators and woreda experts at various times. The first technical advice was given during MIS training, followed by on-the-job training during data processing support. In addition to this the GISA and MEA are preparing to give a formal training on data quality assessment guideline during the next quarter.

QA for hydrological data collection was discussed in the previous quarterly report. This remains an issue that has been discussed at various meetings in the BoWRD. No solutions were found during this quarter as to how to improve quality of punched in data in the database. Hence, also the HYDATA database has not yet been taken into use, since input of data into HYDATA requires a completely clean data set to be created in Excel. Possibilities for involving additional staff at the BoWRD for data processing is under discussion.

Prepare and carry out process and thematic evaluations and prepare independent evaluations (3.2.12). The national consultant for Process Monitoring submitted his final report at the end of



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August 2010 (see also 3.4.17). The final report will be published on the project web page soon (WME Report Nr 26).

3.3 Capacity building (point 3.3)

Design of training manuals for monitoring and reporting, and data processing (3.3.7 and 3.3.8). An automated data processing system has been developed by the TA team. The objective of this system is to organize, process and report each community watershed planning data at yearly and quarterly bases and achievement data at monthly bases. The idea is to implement this system at woreda and region level. A short and simple manual for data processing has been prepared and training has been given to the woreda experts (Annex 4).

In addition to this manual the GISA is preparing an MIS guideline that helps the regional and woreda staff to understand the main assumptions and logics behind the MIS system.

A manual for the operation and maintenance of hydrological MMP stations was produced during the quarter, and annexed to this report (Annex 2).

Implement MIS and Geodatabase system (3.3.9). The MIS system is already implemented at Woreda and regional level. The geodatabase is implemented at TA level. At Woreda level GPS availability and lack of training has delayed the implementation of the geodatabase, and therefore basic training in the GIS application and Geodatabase development will be given for Woreda and regional experts during the next quarter.

Implement Organizational Development for CWTs, KWTs and WWTs (3.3.12). Terms of references for hiring a national consultant were drafted and circulated for comments. The ToR includes capacity building, organizational development and facilitation of credit facilities for the self-help groups and user-groups including the Community Watershed Teams. The short-term national consultant (Ato Zelalem Anteneh) was selected and assumed duties in August. The first quick round visit to the project woredas was carried out in mid-August and the final round field work started in the final weeks of September 2010. Watershed communities, community watershed team members, DAs, community development facilitators, Woreda agricultural experts and members from regional and Woreda ACSI, Cooperatives, Youths, Women, Justice and micro-enterprises were consulted. The STC, together with the RPCU (Ato Mitiku) and CBNA of the WME TA Team have made a two day introductory field visits to Woredas of South Gondar (Dera, Estie and Farta). Community facilitators, Woreda watershed Team members, Woreda Youth's Office, Woreda Micro and Small Enterprise Office members have been consulted in Dera Woreda. By the last week of September, 2010 field work in Sekela and Mecha Woredas has been completed together with the Project Coordinator (Ato Alehegn) and CBNA. The STC has submitted the inception report. Further fieldwork in the project Woredas of South Gondar Zone is scheduled to take place in the first weeks of October and the draft consultancy report is expected by the end of October.

Train BoARD in use of Data Quality Assessments (3.3.15).

The BoWRD counterparts have been trained in data Quality Assessment routines relating to hydrological data. However, routine data QA was not carried out at all during this quarter. The problem is being assessed.

3.4 Information sharing (point 3.4)



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Implement Information Dissemination and Publicity Strategy at all levels (3.4.2). Various WME reports were published on the project web page. Additionally, A1 component and other projects working on hydrological monitoring have been contacted for information sharing. An information needs questionnaire relating to hydrological data was developed during this quarter and disseminated to stakeholders related to hydrological data collection and need. A workshop for hydrological information needs has been planned during this quarter, to be coordinated with the A1 component at a later stage.

Coordinate data sharing, and define responsibilities for information gathering, management, updating and monitoring (3.4.3). Relating to the MIS database, responsibilities are defined for Community watershed team members, Development Agents, Community facilitators and Woreda experts in data gathering, management, updating and generating reports.

Efforts to link with A1 component have continued, including the planning of a common information needs workshop. Coordination between BoARD and BoWRD have continued with regards to the hydrology MMP. The BoWRD is responsible for the information gathering, management, updating and monitoring for the Microwatershed Monitoring Programme. At Subwatershed level sediment monitoring responsibility lies within the hydrology department, however, the capacity is not sufficient to take on this responsibility at present.

Prepare spatial presentation of watershed, catchments and communities (3.4.4).

The first microwatershed delineation was made by HALCROW. This delineation simply follows the river networks. Therefore, the delineation was not manageable in size, since it ranges from 160 to above 2000 ha (while the CWMG recommends watersheds to be kept below 500ha). Due to this unmanageable size, the TA team and Woreda NRM teams recommended to reduce the size of community watersheds in which B1 implementation is taking place.

Based on this recommendation, the community watersheds for TBIWRDP B1 has been re-delineated, in order to achieve watersheds of a more manageable size. This delineation changes not only the size, but also it increases the number of community watersheds from 82 to 162. This new delineation is added to the MIS database and also into the geodatabase.

Distribution maps of rain gauges (Annex 5) were updated for hydrological monitoring.

Publish with-and without project reports (3.4.7). With regards to hydrological monitoring this has been done in the MMP baseline report. The combined NRM and SE study is underway in the same with-without project microwatersheds, and corresponding information will be published in the forthcoming NRM and SE Baseline Report.

Publish Hydrological, Natural Resource and Socio-economic baseline studies on the website (3.4.8). Hydrological baseline report has been published on the project website as WME report nr 20. The Combined natural resources and socio economic baseline survey will be available for publication during the next quarter.

Ensure information sharing between B1 hydrological results and A1 component (3.4.9). The A1 component has been fielded, and is implemented by the French consultant BRL. The team members were contacted by the WRMA, and the chief hydrologist has been taken to Baskura and Kentay outlets, and the coordination of the duties has been discussed. The Team Leader, Ms Carole



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Corneille, has also been contacted and met for discussions between the WRMA and the short term hydrologist. The overall project coordinator Mr Verdonck has also been contacted.

Prepare Targeted Information packages (e.g. Farmers, schools, women, Woreda experts, decision makers etc. (3.4.10)). Various information packages are necessary for different users, therefore in the development of MIS system an effort was made to handle this issue i.e. in report generation interface, there are number options that helps to generate different level of report for different stakeholders.

Various hydrological monitoring reports have been prepared and published during the quarter. The baseline report, as well as the access road costing report, are available at the web site. The STC hydrologists reports are pending approvals from the RPCU, and will thereafter be published on the web site.

Efforts have been made to map information needs relating to hydrology, by distributing a questionnaire to stakeholders at national (ENTRO, MoWR, IMWI), regional (BoWRD), Zonal and Woreda (Water Offices) level. No filled in questionnaires were received within the quarter. The aim of this information need mapping is to design a hydrological report template according to these needs, which can serve as a model for reports to be prepared at regular basis by the BoWRD:

Prepare tools and reporting formats for Client Interactive Monitoring method (3.4.12).

No activities during this quarter, a draft CIM methodology will be prepared during the next quarter.

Conduct participatory process evaluation at community level (3.4.13). Identification of key processes in the watershed development activities and indicators has been conducted through the recruiting of a short term national consultant during the quarter. A series of discussions on the status of these processes or indicators have been done with selected community watershed team members. Community watershed committees have set regular monitoring dates to discuss on planning of activities, progress of their achievements, constraints etc.

The short term national consultant submitted the final report during the quarter, which the RPCU approved. In this process monitoring report;

- Key project related processes were identified and the status of each was assessed. This will help in future similar follow up activities.
- Different level capacity constraints/gaps were identified and intervention measures were suggested that will lay foundation for proper social mobilization to enhance the implementation process and achieve project objectives,
- Suggested different recommendations that will help for future project implementation and follow up process,
- Good lessons were identified for scaling up within and outside of the project area,

The report will be put in the WME web site as Report No 25 for use in the future similar tasks.

Analyze and implement results of Satisfaction Surveys (3.4.14). No activities during this quarter, a draft CIM will be prepared during the next quarter.

3 5 Monitoring & Evaluation institutionalization (point 3.5)



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Present arrangements for MIS Geodatabase system implementation with Reg. Govt system

(3.5.1). There is an effort to implement the MIS system at region level. The project coordinator has started to use the system, and currently the RPCU is in the process of recruiting the M&E expert. Therefore, in the next quarter handing over of MIS tasks to the new counterpart will begin. The Geodata base has not yet been implemented within the Regional Government, due to the procurement of GPSs being delayed. Therefore also training at Woreda and Regional levels in the use of GPS and Geodatabase has not been sufficient. For the purpose of data collection using GPS and for the purpose of the mapping, an introductory GIS training has been given to the woreda experts, but this is not sufficient. Further training is planned for the next quarter in the implementation of the geodatabase, both at Woreda and region level.

The hydrological database, HYDATA, has been set up at the BoWRD, in the counterpart office. The database will be operated from one desk top computer only, and the office has further been furnished with log books for the HYDATA Master database, the EXCEL master database, for remarks by anyone working on these files. An external hard drive has been procured by the WME to provide a safe back-up system for the database.

Plan and propose database coordination committee, define roles and responsibilities within Reg. Gov. systems (3.5.2).

It has been proposed that the hydrological monitoring programme be decentralised to Woreda level. A Woreda Water Office capacity assessment was started during the quarter to assess the feasibility of this proposal. The capacity assessment will be finalised during the sixth quarter.

Finalize and hand over M&E guidelines (3.5.6).

A first draft of the MMP guideline was prepared during the quarter, including detailed descriptions of how operate all parts of the MMP hydrological monitoring. The finalisation of the MMP guideline will be carried out during the sixth quarter through testing the guideline in the field and filling in any gaps. The guideline will be handed over to the BoWRD for replication and further training of staff members.

Extracurricular activities

The following tasks were performed by the GISA, on request from RPCU

1. Preparing topomaps and slope map for each community watersheds

To support Participatory community watershed planning study at woreda level, the GISA prepared 98 community watershed maps by back grounding topo map and 98 slope map with its corresponding area. These maps are prepared for four woreda namely Fareta, Mecha, Sekela Woreda and Debre Tabor Town. He is also in the process to prepare such maps for Dera and Estie Woreda. A landuse map of each community watershed is also under planning. This will reduce the workload of the combined study team.

2. Giving orientations for woreda on preparing participatory community watershed plan

Orientation on participatory community watersheds planning steps, how to approach community in problem identification, prioritizations and planning has been given to four Woredas; Fareta, Sekela, Mecha and Debre Tabor town. Different techniques and ways were given in identifying the root cause for main problem and how to prepare an achievable community plan.



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3. *Giving on-the-job training on the use of GPS data collection and changing the collected data into maps.*

On-the-job training on data collection using GPS has been given during orientation, based on this acquired knowledge the woreda experts collected a number data. However, they faced problems in changing this data into maps. The GISA has delivered refreshment training on data collection using GPS and also mapping the collected data in GIS software. This will help the woreda experts in preparing the existing and developmental map of community watershed.

4. *Computer Maintenance*

Two computers used for the MIS Database and other secretaries computers were maintained in Mecha Woreda by the GISA. In both computers the operating system was corrupted and the system was not able to open.

5. *Supporting BoARD in staff recruitment*

The TA Team assisted the RPCU in the recruitment of TBIWRDP B1 staff members i.e. one livestock and one crop specialist.

3.6 Backstopping and home office support (point 5)

No Home Office Coordinator visit this quarter.

4 Financial report

4 1 Bilateral funds

4 1 1 Financial status at the end of September 2010

The Tana-Beles WME project costs during the first three quarters (1.1. – 30.9.) of 2010 were 325,508 Euros, against the budgeted year 2010 total of 666,914 Euros (Table 10). The total expenditure from the beginning of the project (1.6.2009) is 726,648 Euros. It is 48 per cent of the project total budget. The percentage is higher than the figure arithmetically calculated from the duration of the project time; that is 31 per cent (16 out of 52 months). The difference is due to the project planning principle. The biggest share of the project inputs is scheduled to take place in the first two years (2009 and 2010) of the Tana-Beles WME project.

Table 10. Tana Beles WME project cumulative costs in 2010.



Tana Beles WME

Table 1. Tana-Beles WME project budget and costs 30.9.2010								15.10.2010
Code		used 2009	budget 2010	used Jan-Sep	budget 2011	budget 2012	budget 2013	Total
	Management	232 262	272 768	195 474	88 840	51 940	80 530	726 340
	Subtotal	232 262	272 768	195 474	88 840	51 940	80 530	726 340
	Short-term:							
121	Unspecified international	29 095	81 272	39 000	0	0	36 789	147 156
122	Unspecified national		20 502	5 463	0	10 251	10 251	41 004
	Subtotal	29 095	101 774	44 463	0	10 251	47 040	188 160
	Reimbursables related to long-term TA:							
211	International travel, experts	3 220	2 780	2 056	4 500	4 500	7 500	22 500
212	International travel, dependents	1 062	2 529	0	0	0	0	3 591
213	Domestic flights	786	3 833	1 103	600	2 400	2 400	10 019
214	Housing + guard (TL), BD	2 860	7 190	4 526	6 000	6 000	4 500	26 550
215	Housing + guard (Ini II), BD	1 489	6 408	3 291	500	0	0	8 397
216	House renovations	64	6 368	1 488	0	0	0	6 432
217	Household amenities	5 725	5 704	976	0	0	0	11 429
218	Hotels, long-term	4 327	5 673	3 699	9 000	4 500	12 000	35 500
219	DSA, long-term	3 365	3 108	3 660	3 420	1 710	4 560	16 163
220	Freight of personal goods	4 112	1 472	0	2 400	0	0	7 984
221	Permits and legal fees	1 077	7 458	3 967	600	600	600	10 335
	Subtotal	28 087	52 523	24 766	27 020	19 710	31 560	158 900
	Reimbursables related to short-term TA:							
311	International travel	1 995	11 505	0	0	0	4 500	18 000
312	Domestic flights (I STC)	61	4 339	227	0	0	1 800	6 200
313	DSAs (I STC)	1 748	13 674	612	0	0	3 420	18 842
314	Accommodation (I STC)	678	8 404	142	0	0	4 500	13 582
321	Domestic flights (N STC)	0	558	144	0	0	960	1 518
322	DSAs (N STC)	0	1 443	393	0	0	1 710	3 153
323	Accommodation (N STC)	0	3 000	399	0	0	3 150	6 150
	Subtotal	4 482	42 923	1 917	0	0	20 040	67 445
	Reimbursables related to HO visits							
411	International travel	0	1 287	0	0	0	1 500	2 787
412	Domestic flights (I STC)	72	79	0	0	0	300	451
413	DSAs	190	76	0	0	0	532	798
414	Accommodation (I STC)	789	357	0	0	0	700	1 846
	Subtotal	1 051	1 799	0	0	0	3 032	5 882
	Support Staff:							
510	Drivers (2)	1 516	10 284	7 446	0	0	0	11 800
520	Office assistant	0	5 850	1 800	0	0	0	5 850
	Subtotal	1 516	16 134	9 246	0	0	0	17 650
	Studies, evaluations, M&E system development							
610	Hydrological baseline	94	25 830	320	0	0	0	25 924
620	Socio-economic baseline	176	53 167	11 901	0	0	0	53 343
630	Village-based monitoring system	3 502	37 893	11 335	0	0	0	41 395
640	Process and thematic evaluations		2 000	0	2 000	2 000	2 000	8 000
650	M&E system training	3	3 997	1 703	731	0	0	4 731
660	M&E system development and training	0	1 000	0	0	0	0	1 000
670	Audit		4 000	0	0	0	0	4 000
	Subtotal	3 775	127 887	25 259	2 731	2 000	2 000	138 393
	General TA reimbursables							
711	Vehicles (excluding duty)	62 241	6 177	1 932	0	0	0	68 418
712	Vehicle rental	19 432	721	815	5 000	5 000	3 000	33 153
713	Petrol, service, insurance etc.	3 774	14 549	9 252	0	0	0	18 323
714	Computers, office equipment	12 422	12 584	7 608	0	0	0	25 006
715	Software, SPSS and ArcGIS		3 082	1 690	0	0	0	3 082
716	Communication	1 719	11 031	2 018	6 000	6 000	4 500	29 250
717	Miscellaneous	1 284	2 962	1 068	1 313	1 313	1 339	8 209
	Subtotal	100 872	51 106	24 383	12 313	12 313	8 839	185 442
	GRAND TOTAL, TA	401 140	666 914	325 508	130 904	96 214	193 041	1 488 212
	Contingency							11 788
	GRAND TOTAL, TA + Contingency							1 500 000



Expenditure occurred during 1.1.2010 – 30.9.2010

The expenditure (325,508 €) occurred during the period 1.1.2010 – 30.9.2010 and the possible savings or over expenditure have been described by budget line in Table 10. The deviation is calculated with the formula $[9/12 * \text{Budget2010} - \text{Expenditure occurred}]$.

The narrative for the budget lines is as follows:

In the collective line Management (TA-team and home office) there is a calculated saving of 9102 €. This is rather well within the calculated 9 months budget (204,576 €).

121 Unspecified international consultants. There seem to be savings of 21,954 € in the budget line. They may not be real as the consultancy for International Peer Review in Combined Baseline survey has not been invoiced yet. The invoicing will take place by the end of 2010.

122 Unspecified national consultants. There is a saving of 9,914 € which is partly true. The Process Monitoring Consultancy and the Access Road Consultancy have been only partly invoiced.

211 International travel, shows saving of 29 €. This is a true saving.

212 International travel, dependants shows saving of 1897 €. This is a true saving.

213 Domestic flights shows savings of 1772 €. This is a true saving as the number of project meetings in Addis Ababa has been less than anticipated.

214 Housing + guard (TL) shows saving of 867 €. This is a true saving.

215 Housing + guard (Int Expert) shows savings of 1515 €. This is a true saving.

216 House renovations shows savings of 3288 €. This is a true saving.

217 Household amenities shows savings of 3302 €. This is a true saving.

218 Hotels, long-term. This shows saving of 556 €. This is a true saving.

219 DSA long-term. This shows over expenditure of -1329 €. This is true cost as much field work has taken place during the quarter.

220 Freight of personal goods. This shows saving of 1104 €. This may not be a true saving, as the Water resource monitoring adviser is budgeted to complete her long term contract during the latter half of 2010.

221 Permit and legal fees shows savings of 1627 €. This is not a true saving as clearing and forwarding process of hydrological instruments of 2010 have not been invoiced yet.

311 International travel for short term consultants shows savings of 8629 €. This is only partly true savings as some of the consultants' international travel costs have not been invoiced yet.



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Table 2: Tana-Beles WME costs and savings on 30.9.2010 (9 months out of 12 in 2010)

Code		Budget 2010	Budget for Rept period: 9 months	Used during past 9 months	Deviation
	Management	272 768	204 576	195 474	9 102
	Subtotal	272 768	204 576	195 474	9 102
	Short-term:				
121	Unspecified international	81 272	60 954	39 000	21 954
122	Unspecified national	20 502	15 377	5 463	9 914
	Subtotal	101 774	76 330	44 463	31 867
	Reimbursables related to long-term TA:				
211	International travel, experts	2 780	2 085	2 056	29
212	International travel, dependents	2 529	1 897	0	1 897
213	Domestic flights	3 833	2 875	1 103	1 772
214	Housing + guard (TL), BD	7 190	5 393	4 526	867
215	Housing + guard (Ini II), BD	6 408	4 806	3 291	1 515
216	House renovations	6 368	4 776	1 488	3 288
217	Household amenities	5 704	4 278	976	3 302
218	Hotels, long-term	5 673	4 255	3 699	556
219	DSA, long-term	3 108	2 331	3 660	-1 329
220	Freight of personal goods	1 472	1 104	0	1 104
221	Permits and legal fees	7 458	5 594	3 967	1 627
	Subtotal	52 523	39 392	24 766	14 626
	Reimbursables related to short-term TA:				
311	International travel	11 505	8 629	0	8 629
312	Domestic flights (I STC)	4 339	3 254	227	3 027
313	DSAs (I STC)	13 674	10 256	612	9 644
314	Accommodation (I STC)	8 404	6 303	142	6 161
321	Domestic flights (N STC)	558	419	144	275
322	DSAs (N STC)	1 443	1 082	393	689
323	Accommodation (N STC)	3 000	2 250	399	1 851
	Subtotal	42 923	32 192	1 917	30 275
	Reimbursables related to HO visits				
411	International travel	1 287	965	0	965
412	Domestic flights (I STC)	79	59	0	59
413	DSAs	76	57	0	57
414	Accommodation (I STC)	357	268	0	268
	Subtotal	1 799	1 349	0	1 349
	Support Staff:				
510	Drivers (2)	10 284	7 713	7 446	267
520	Office assistant	5 850	4 388	1 800	2 588
	Subtotal	16 134	12 101	9 246	2 855
	Studies, evaluations, M&E system development				
610	Hydrological baseline	25 830	19 373	320	19 053
620	Socio-economic baseline	53 167	39 875	11 901	27 974
630	Village-based monitoring system	37 893	28 420	11 335	17 085
640	Process and thematic evaluations	2 000	1 500	0	1 500
650	M&E system training	3 997	2 998	1 703	1 295
660	M&E system development and training	1 000	750	0	750
670	Audit	4 000	3 000	0	3 000
	Subtotal	127 887	95 915	25 259	70 656
	General TA reimbursables				
711	Vehicles (excluding duty)	6 177	4 633	1 932	2 701
712	Vehicle rental	721	541	815	-274
713	Petrol, service, insurance etc.	14 549	10 912	9 252	1 660
714	Computers, office equipment	12 584	9 438	7 608	1 830
715	Software, SPSS and ArcGIS	3 082	2 312	1 690	622
716	Communication	11 031	8 273	2 018	6 255
717	Miscellaneous	2 962	2 221	1 068	1 153
	Subtotal	51 106	38 329	24 383	13 946
	GRAND TOTAL, TA	666 914	500 185	325 508	174 677



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312 Domestic flights for short term consultants shows savings of 3027 €. This is partly true saving, as some of the consultants' domestic travel costs have not been invoiced yet; in general the need for domestic flight travel has been less than anticipated.

313 DSA's for short term consultants shows savings of 9644 €. This is only partly true saving as the consultancies for International Peer Review in Combined Baseline survey and Hydrology have not been fully invoiced yet.

314 Accommodation for International Short term consultants shows savings of 6161 €. This is partly true saving, as the lodging costs in Ethiopia, especially in Bahir Dar have been lower than originally anticipated. In addition, the invoicings for the international consultancies are still in process.

321 Domestic flights, national consultants shows savings of 275 €. This a true, minor saving.

322 DSAs for national consultants shows savings of 689 €. This is a true saving.

323 Accommodation for national consultants shows savings of 1851 €. This is a true saving.

411 International travel for Home Office visits shows savings of 965 €. This is not a true saving as the home office visits 2010 have not taken place yet.

412 Domestic flight for Home Office visits shows savings of 59 €. This is not a true saving as the home office visits 2010 have not taken place yet.

413 DSAs for Home Office visits shows savings of 57 €. This is not a true saving as the home office visits 2010 have not taken place yet.

414 Accommodation for Home Office visits shows savings of 268 €. This is a true saving as the home office visits 2010 have not taken place yet.

510 Drivers (2) shows savings of 267 €. This is a true saving.

520 Office assistant shows savings of 2588 €. This is not a true saving as the office assistant (accountant) payments for 2010 are done as partnership bulk payments between Niras and Orgut home offices.

610 Hydrological baseline study shows savings of savings of 19,053 €. This is not true saving as considerable hydrological monitoring activities, including procurement of equipment, have taken place during the quarter and have not been invoiced yet.

620 Socio-Economic (and Natural resources, combined) baseline studies show savings of 27,974 €. This is not a true saving as the total survey price has been divided in three payments, not evenly by months. Only the first payment has been done so far.

630 Village-based monitoring system (Microwatershed based monitoring) shows saving of 17,085 €. This is not true saving as considerable hydrological monitoring activities, including procurement of equipment, have taken place during the quarter and have not been invoiced yet.



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640 Process and thematic evaluations shows savings of 1500 €. This is partly a true saving as the process evaluation was done by the Process monitoring (national) consultancy.

650 M & E system training shows savings of 1295 €. This is a true saving.

660 M & E system development and training shows savings of 750 €. This is a true saving.

670 Audit shows saving of 3000 €. This is not a true saving as the project auditing has been scheduled to happen during the latter half of 2010.

711 Vehicles shows savings of 2701 €. This is a true saving.

712 Vehicle rental shows over expenditure of -274 €. This is true over expenditure, as the Bahir Dar University executed combined baseline survey was supported by hiring more vehicles than originally anticipated.

713 Petrol, service, insurance etc shows savings of 1660 €. This is a true saving.

714 Computers, office equipment shows saving of 1830 €. This is a true saving.

715 Software, SPSS and ArcGis shows savings of 622 €. This is a true saving.

716 Communication shows savings of 6255 €. This may not be a true saving as development of the project web-pages and the web-based monitoring and evaluation system started in reality in March-April 2010.

717 Miscellaneous shows savings of 1153 €. This is true saving. It is expected that as there is an increasing need for undefined office expenditure, that will be allocated to this budget line.

Savings at the end of budget period. In total the Tana-Beles WME project shows savings of 174,677 € at the end of September 2010. Parts of these are true savings that can be used as a basis for minor budget revision. However, it is to be noted that about 100,000 Euros of the savings have already been committed to hydrological and combined natural resources & socio-economic baseline studies.

4 2 Progress of Tana-Beles Watershed Development B1

Table 11. B1 component financial utilization by September 20th 2010 (Nihasia 30, 2002 EC)

Project Woredas	Total transfers up to Nihasia 30, 2002	Remaining Remaining Balance as of Nihasia 30, 2002	Total utilized as of Nihasia 30 2002 (Septmeber 20, 2010)
Farta	4732677	1 634967.24	3097709.76
Estie	1465009	524769.02	940239.98
Dera	1691165	286469.28	1404695.72
S/Gondar	12000	61.70	11938.30
Mecha	2201505	998452.52	1203052.48
Sekela	1161100	620427.60	540672.40
BoARD	3389241	2941011.59	448229.41
Total	14652697	7006158.95	7,646,538.05



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The total utilisation percentage was, at the end of Nihasia, 52%, varying between 13% utilisation (BoARD) and 99% utilisation (S/Gondar Zone).

4.3 Proposal for budget revision No 5 (Tana-Beles WME main budget)

A fifth budget revision will be required in the next quarter. This revision will consider savings made during the first quarter (it is estimated that 20-25% of the budget will not be spent by the end of the year). The main budgetary issues are foreseen to revolve around the employment of drivers in 2011.

5 Analysis

5.1 Quarter of Baseline Studies and Short Term Consultancies

The quarter was a time of high activity in the WME component. Supporting the ongoing BDU implemented combined baseline studies has taken the major part of the past quarter. The study covers a wide area, and has required repeated field working periods, which nevertheless are deemed necessary and worthwhile to acquire adequate data for the baseline studies.

A number of short term consultancies were implemented during this quarter, namely;

- Access Road Costing Study, National Consultancy, additional 10 days in August
- Process Monitoring, National Consultancy was finalised
- International Peer Review of the Combined Study, (level KEH-1, second input in July)
- Community Capacity Building, National Consultancy started during the quarter
- Hydrology, International Consultancy (Level KEH-2, 27 working days) second input was implemented during the quarter

The access road costing study resulted in cost estimates for various access road routings to subwatershed outlets, as well as estimates of numbers of beneficiaries of each access road. The information has been used as an input to a more comprehensive subwatershed outlet report.

The Process Monitoring identified and assessed main processes within the TBIWRDP B1 component and suggested intervention measures to further improve social mobilization, to enhance the implementation process and achieve project objectives.

The peer reviewer has concentrated on the guidance of field work and analyses of gaps to be filled by the BDU field teams. As a result, e.g. soil data, which had been ignored during the first field missions, has been later collected using simplified methods. This illustrates the need to simplify data collection to parameters which are possible to collect also with smaller budgets and by lesser trained staff. Ensuring that a repeated study can be carried out at the end of the B1 activities, to evaluate the impact of the programme, must be considered when planning the methodology of monitoring programmes.

The hydrology short term input concentrated on the utilisation of the procured Lot 1 equipments for hydrological monitoring. Equipments were checked, calibrated, and installed. Training was given to staff members of Tana Subbasin Organisation, Abay Basin Authority, BoWRD, BoARD, IMWI, BDU and South Gondar Zone and Woreda experts.



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The hydrology short term input produced two main written outputs, the consultancy report including e.g. the subwatershed outlet report, and a manual which is intended for any BoWRD staff members operating the MMP system. This manual forms part of the exit strategy and sustainability efforts of the hydrological monitoring component. However, the need for adequate, well educated staff members to continue with the work cannot be emphasised enough. Likewise, budgets for field vehicles operations, field work costs, laboratory analyses, and the like must be ensured in order to continue the work.

5.2 Analysis of the progress of the WME component and institutionalisation need

At the end of the fifth quarter, the WME component has been present for more than a year. At the end of 2010, the full WME TA team will no more be present, as the WRMA inputs will cease in December 2010, the TL full-time input will come to an end in March 2011. Handing over of these activities has started, by the WRMA to the BoWRD counterparts, and by the TL to national long term experts.

However, also the national long-term input will come to an end during 2011. 16 out of 28 total months have been spent by the GISA and CBNA. 16 out of 22 total months has been spent by the M&EA (ending in May 2011). The national TA Team members have still not been assigned counterparts from the BoARD, to ensure institutionalisation of the M&E activities. Institutionalisation and handing over of tasks will become increasingly important in the WME work plan, as the second year of operation is advancing.

5 3 Issues likely to arise during the next quarter

Combined Natural Resources & Socio-Economic Baseline survey will be completed by Bahir Dar University during next quarter. The final input of the International Peer Reviewer (Dr. Assefa Melesse) is rescheduled to concur with the reporting phase. This is of great significance for the WME component, since the baseline values will finally be populated in the M&E indicator tables. This will make the indicators useful monitoring tools, as the progress can be thereafter monitored directly in the form of percentage achieved.

The issue of securing data flow from the field to the project office will continue.

Likewise, the need of refresher training will continue in the next quarter. Special training, especially in computerized M & E, GIS, Database management and MIS is one way to motivate the relative young staff to remain in their Woreda positions. This is an additional justification for the capacity building, exercised by the WME project.

The Microwatershed Monitoring Programme has been established by the WME component, and counterpart staff has been trained for nearly one year to operate the system. All equipments, training and installations to monitor discharge, suspended sediment, turbidity and rainfall, have been successfully carried out by the WME component. The future success of this monitoring programme, which is among the very few actual systematical environmental data collection and monitoring programmes in use in Amhara, depends on the institutional will and capacity of BoWRD to continue with the work, starting in the next quarter.



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The subwatershed outlet level stations are pending on rapid decisions to be made relating to 1) financing of access roads and 2) procurement of subsequent Lots of equipments. If road financing is not secured, there will be no need for the procurement of further equipments either, and subsequently no subwatershed level monitoring.

The first procurement proposal for the hydrological monitoring stations (Lot 1) has been effected by the WME component. The subsequent procurements and contacts (Lot 2 and Lot 3) for the hydrological installations will be done through Tana-Beles regular funds and procurement procedures. The subwatershed report includes complete lists of equipments and budgets needed for 1,2 or 3 subwatershed outlet stations. The procurement required should proceed as soon as possible.

5 4 Recommendations

- (1) Further data processing staff is required to handle the hydrological data flowing into the monitoring system at BoWRD. Skilled data processors are needed to carry out data QA, and also perform routine analyses.
- (2) The MMP should continue involving the Woreda Water Offices, and training the staff in the operations needed at the MMP level.
- (3) A decision relating to the construction of access roads to the subwatershed outlets is required in order to start establishment of hydrological stations at this geographical level.
- (4) Refresher training is required of woreda and kebele level staff on community watershed planning, reporting, MIS/Database management, data entry, data quality assessment and related project cycle management issues.
- (5) The newly recruited BoARD counterparts should start their work as soon as possible and work in close interaction with the TA Team to ensure handing over and institutionalisation.
- (6) The GPS procurement process should be speeded up by the B1 component, to enable implementation of the Geodatabase, which requires coordinates for each activity.
- (7) The MIS database is becoming very large. Therefore there will be a need to migrate the data from MS Access database to SQL server database.

6 Plan for the next quarter (1.10.-31.12.2010) against Project Result areas (WME component)

6 1 Result 1: Project Management and WME project start up

This result area is completed.

6 2 Result 2: Indicator finalization and baseline studies

The set of indicators were revised during the quarter, as it was discussed during the World Bank & Embassy of Finland support mission in June 2010. Monitoring will continue to be tested with the revised set.

For hydrological baselines at microwatershed level, the only outstanding issue is collection of discharge measurements from the 15 MMP stations (2-5 days field work required per station). In addition, staff-discharge relationship curves will be developed and sediment loads can thereafter be calculated from the already existing data.



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Combined Natural Resources & Socio-Economic baseline study will be finalised by Bahir Dar University, with supervision from TA team and the International Peer Reviewer.

6 3 Result 3: Monitoring and Evaluation subsystems

Hydrological monitoring continues on the 15 MMP stations. In addition, subwatershed outlet planning will continue, pending decision relating to construction of access roads. If the construction is agreed, total station surveys, installation of staff and crest stage gauges and training of site managers at 1-3 subwatershed outlets will commence.

6 4 Result 4: Project Monitoring and Evaluation

The handing-over and institutionalisation of the hydrological monitoring programme will continue until December, when the WRMA inputs are finalised, except of a one-month input which will be saved for reporting needs later on.

6 5 Result 5: Backstopping and Home Office Support

Backstopping and Home Office support continues over email and internet.

6 6 Result 6: Staffing schedule

The Technical Assistance Team is full on duty during the next quarter, except WRMA who ends her second input early December 2010. International Peer Reviewer for the Combined Natural Resources & Socio-Economic baseline survey completes his assignment during the next quarter .

In Bahir Dar, October 2010

Alehegne Dagnew
Project Coordinator
Watershed Development B1

Mikaela Kruskopf
Acting Team leader
Tana-Beles WME



Principal sources and references:

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Watershed management sub-component. Quarter report (2009). Dated 12.10.2009. BoARD. 6 p.

Tana-Beles Integrated Watershed Development Project Watershed Management Sub-Component Annual Report (2010)

Tana-Beles WME – Quarterly Report for 1.4.-30.6.2010

Tana-Beles WME – Monthly Report for July 2010

Tana-Beles WME – Monthly Report for August 2010

Tana-Beles WME – Mid Term Report by Combined Baseline Study Peer Reviewer

Tana-Beles WME – Process Monitoring, Short Term Consultancy Report

Tana-Beles WME – Hydrology, Short Term Consultancy Report

Tana- Beles WME – Access Road Costing, Short Term Consultancy Report

All the Tana-Beles WME reports are downloadable in <http://tana-beleswme.org>

Other WEB -links

Tana-Beles Integrated Water Resources Development – Project facts:

<http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=40941&menuPK=228424&Projectid=P096323>

Annexes

Annex 1: List of trainees in HYDATA database, and hydrological equipment theory and field training events

Annex 2: Microwatershed Monitoring Programme (MMP), Manual

Annex 3: Subwatershed Outlet Report

Annex 4: Data Processing Manual for Woredas

Annex 5: Map of additional raingauges installed in MMP watersheds

Annex 1. Attendees in training given by the Hydrology Short Term Consultant Peter Baur, and the WRMA.

Name	Institution	Contact details	Hydata training 14.8.2010	Theoretical training, 19.8.2010	Field training 20- 21.8.2010	Crest stage gauges & maintenance
Tegegnetwork Tadesse	BoARD PSNP	0911913728 tadtggn@aol.com	X	X	X	
Kibret Kassie	BoWRD t	0918760301	X	X	X	X
Ytsedaw Wubetie	BoWRD	0918718466	X	X	X	X
Kirubel Yilak	Nile Basin Authority (NBA)	0911732600 kirubelber@yahoo.com	X	X		
Mitiku Kebede	BoARD TBIWRDP B1	0918705092	X			
Seifu Admasu	BDU	0918760910 seifuad@yahoo.com		X	X	
Muluken Lakachew	Tana Sub Basin Organisation, Head	0198028563 mulukenlak@hotmail.com		X		
Sileshie Mesfin	BoWRD	0912157696 Smesfin2@gmail.com		X	X	
Yohannes Melak	NBA – acting head	Yohannes67@yahoo.com		X	X	
Hailemariam Yisak	NBA – WRM expert	0912138361 haileyisak@gmail.com		X	X	
Hana Tsegau	BoWRD	0918705332		X	X	
Mahlet Mulusew	BoWRD	0920056801 Mahafel4@gmail.com		X	X	
Lakew Desta	WME	0911401459		X		X
Veli Pohjonen	WME	0910968045		X		
Bezawit Adane	BDU	bad@cornell.edu		X	X	
Mebitu Getahun	?	0918309051		X		
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Gadamu Chane	MoWR, hydrology BD	0918 766074				X

Annex 2. Manual for MMP

Annex 2

**WATERSHED MONITORING AND EVALUATION (WME) COMPONENT
OF THE
TANA BELES INTEGRATED WATER RESOURCES DEVELOPMENT
PROJECT (TBIWRDP)
IN ETHIOPIA**

**DRAFT MANUAL FOR
MICRO-WATERSHED MONITORING PROGRAMME (MMP)
October 2010**

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A. Introduction

This document is a reference manual for staff working on the Micro-watershed Monitoring Programme (MMP) under the Watershed Monitoring and Evaluation (WME) project of Component B1 – Watershed Management – of the Tana Beles Integrated Water Resources Development Project (TBIWRDP).

The objective of this manual is to provide detailed information to assist existing and new project staff to understand and manage the MMP and ensure correct use and maintenance of equipment for collection of field data.

B. Objective of the MMP

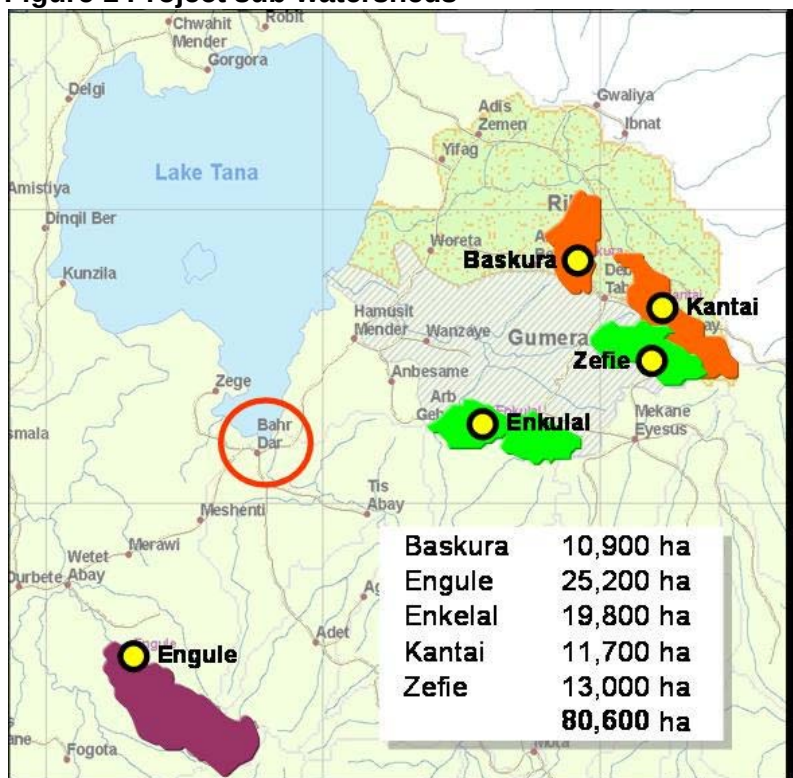
The objective of the MMP is:

- To monitor water and sediment discharge from micro-watersheds for the purpose of evaluating the impact on these variables of watershed management interventions, ie soil and water conservation works.

C. Watersheds

Component B1 of the TBIWRDP – Watershed Management – is implementing soil and water conservation works in five sub-watershed areas ranging in area from 109 km² to 252 km². (Figure 1). Implementation of the works started in 2009 and will continue for five years, finishing in 2014.

Figure 1 Project sub-watersheds



Source: Halcrow Group Ltd (2007).

The sub-watershed areas are divided topographically into “micro-watersheds” ranging in area from about 4 km² to about 10 km². Some of these micro-watersheds have been selected to for monitoring of water and sediment discharge from their watersheds. Figures 2 and 3 show the micro-watersheds selected for monitoring in green and the locations of water and sediment monitoring stations as red dots.

It will be noted that some micro-watersheds lie outside the sub-watersheds. These are ‘control’ watersheds that will not have any soil and water conservation works implemented by TBIWRDP in their watersheds. They provide an opportunity to compare the water and sediment discharge from untreated watersheds with the ‘project’ micro-watersheds which have had soil and water conservation works implemented in them.

C. Institutions involved and their responsibilities

The Bureau of Water Resources (BoWRD), Amhara Region, is responsible for the overall management of the MMP.

During the first two years of the MMP (2009-2010) NIRAS Oy of Finland provided technical assistance in setting up the MMP, selecting and installing monitoring stations, training Station Managers and establishing procedures. The technical assistance will wind down in late 2010. From this time onwards BoWRD will drive the MMP.

At the time of writing (September 2010) the Woredas in whose areas of jurisdiction the micro-watersheds are located (Farta, Este, Dera, Sekela and Mecha) have not had any responsibilities with respect to the MMP. However, BoWRD is starting to integrate the Woredas into the MMP. It is likely that the Woredas role will be to supervise and manage the station managers. Such duties will likely include collection of data sheets and samples from Station Managers and payment of monthly salaries. BoWRD staff will likely collect the data sheets etc from the Woredas. BoWRD will process, store and analyse the data collected.

D. Station managers

Table 1 presents a list of Station Managers by Woreda and station as of September 2010.

Table 1 MMP Station Managers

Woreda	Station	Microwatershed	Station Manager
Farta	St 1	Tikur Wuha	Terusaw Kasa
Farta	St 2	Guale	Endeshaw Getinnet
Sekela	St 3	Washaw	Yetnebirsh Kindew
Sekela	St 4	Mowalele	Achameyleh Tadesse
Farta	St 5	Deledel	Marie Demessey
Farta	St 6	Genametawechea	Andwalem Abebaw
Dera	St 7	Enkulal	Liyu Tadesse
Este	St 8	Megenanja	Lamesgen Gebeyehu
Mecha	St 9	Toma	Awoka Asmare
Sekela	St 10	Bosa	Kes Attaley Gedas
Farta	St 11	Dabuzit	Almaz Tesfaye
Farta	St 12	Agazo	Abeba Mengiste
Dera	St 13	Fogeda	Deres Admass
Dera	St 14	Agar	Arakew Berri
Farta	St 15	Worka	Asmetch Workena

Figure 2 Micro-watersheds in the Baskura, Zefie and Enkulal sub-watersheds

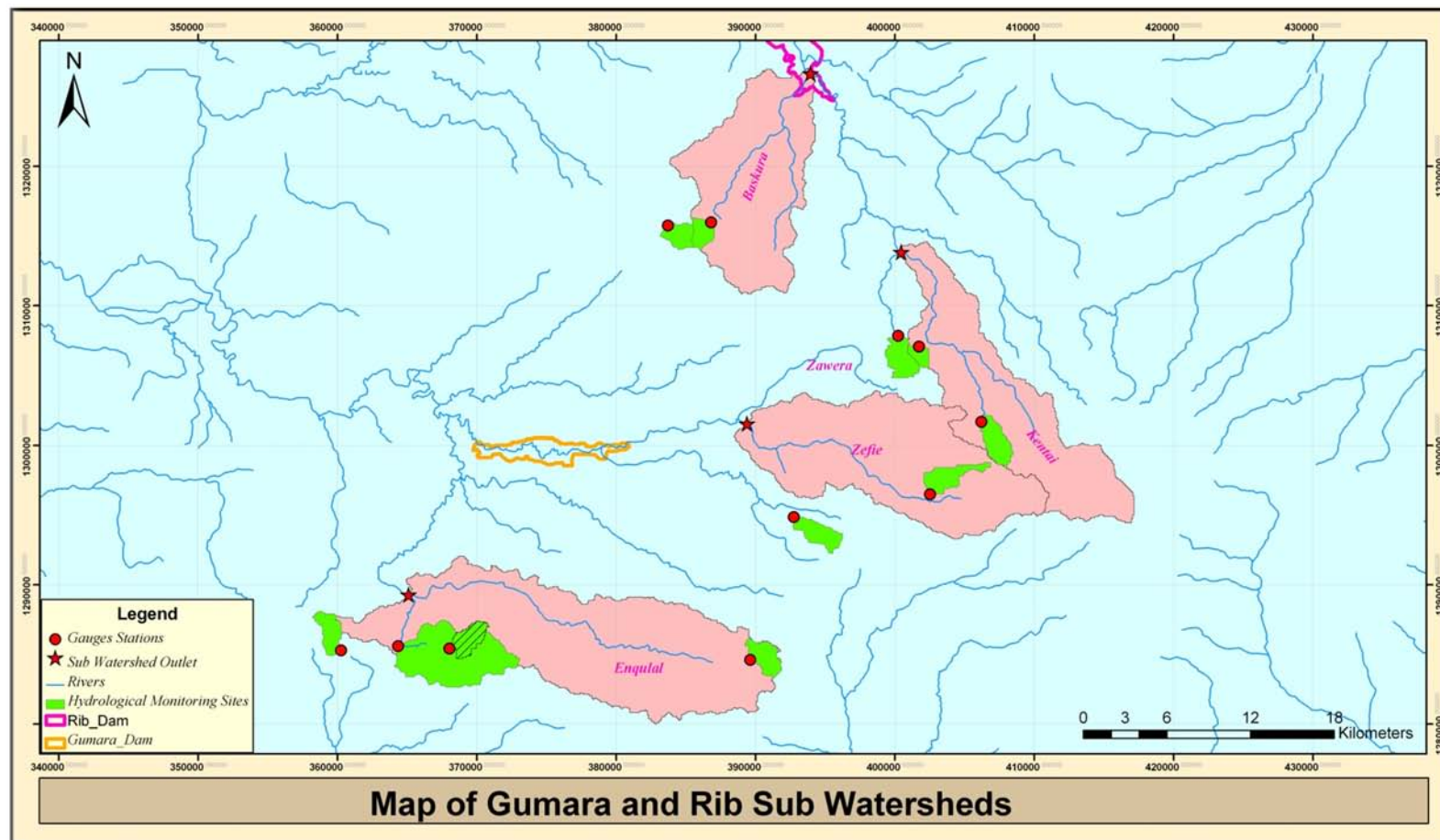
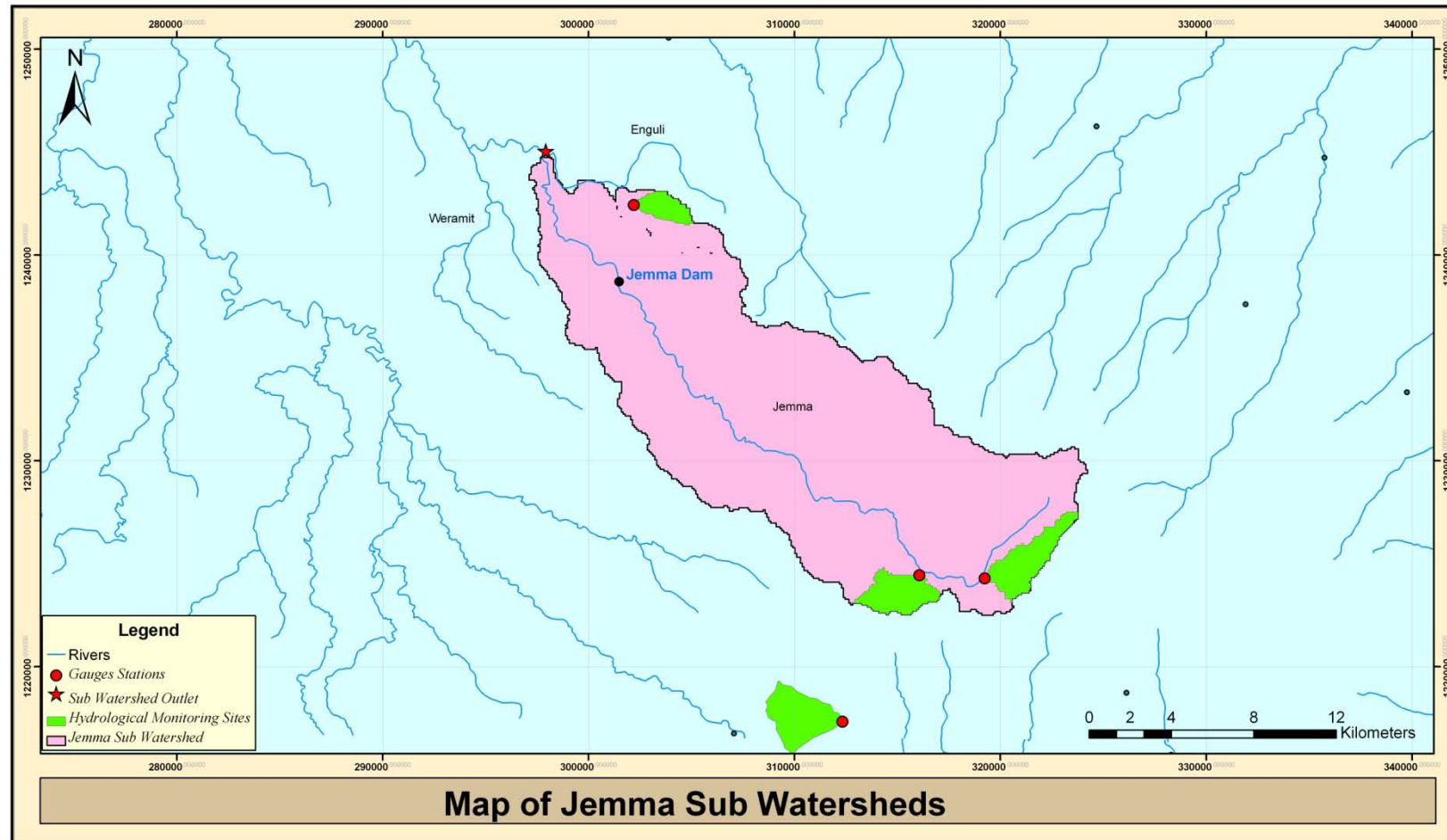


Figure 2 Micro-watersheds in the Jema sub-watershed



E. Flow and sediment monitoring stations

Table 2 presents a list of MMP stations by sub-watershed with details of the watersheds.

Table 2 List of micro-watersheds in MMP at September 2010

Stn No.	Micro-watershed	Station ID	Area km ²	Easting	Northing	Elevation (m)	Woreda	Kebele
Baskura (Ribb) sub-watershed		GSBK00	109	392252	1324765	1960		
5	Deledel	GSBK05	2.8	386899	1316112	2300	Farta	Zagur
15	Worka (Control)	GSBK15	3.3	383674	1315765	2163	Farta	Zagur
Kantai (Ribb) sub-watershed		GSKT00	117					
1	Tikkur Wuha	GSKT01	5.1	406275	1301889	2870	Farta	Hawsit Asawort
2U	Guale Upstream	GSKT02U	TBC	401611	1306972	2693 TBC	Farta	Saharna Kisnat
2D	Guale Downstream ¹	GSKT02D	TBC	406286	1301824	2875	Farta	Saharna Kisnat
11U	Dabezute Upstream (Control to GSKT02U)	GSKT11U	4.9	400159	1307844	2640	Farta	Wowa Mariam
11D	Dabezute Downstream (Control to GSKT02D)	GSKT11D	TBC	400307	1308139	2630	Farta	Wowa Mariam
Zefie (Gumera) sub-watershed		GSZF00	130					
6	Genametawecha	GSZF06	5.0	402519	1296369	2609	Farta	Maynet
12	Agazo (Control to GSZF06)	GSZF12	4.7	392925	1295315	2366	Farta	Meskel Tsion
Enkulal (Gumera) sub-watershed		GSEK00	198					
7	Enkulal ²	GSEK07	4.1	367967	1285429	2300	Dera	Gelawedos
8	Megenanja	GSEK08	4.3	389595	1284792	2468	Este	Shimagle Giorgis
13	Fogeda	GSEK13	28.4	364547	1285799	2211	Dera	Gelawdios / Shime Mariam
14	Agar (Control to GSEK07)	GSEK14	3.6	360658	1284861	2262	Dera	Agar
Engule (Jema) sub-watershed		GSEG00	252					
3	Washaw	GSEG03	6.5	316272	1224601	2445 TBC	Sekela	Gulley
4	Mowalele	G S E G 04	6.6	319455	1224565	2510	Sekela	Le Jambara

¹ The original station was established at the bridge. A dam was built upstream by the road construction company, and the upstream station was established at the end of 2009. The bridge will be taken into use again, to act as a control to the station 2D, as soon as an alternative arrangement for the local irrigation system which has been built under the bridge has been found by the Farta Woreda. The irrigation expert has been contacted, and is looking into alternative arrangements for the irrigation needs of the local farmers.

² Station 7 has been moved on the 27th January 2010 about 100 meters upstream from its original location in 2009. The coordinates refer to the new site, where staff gauges have been installed in January 2010

9	Toma	GSEG09	2.7 checked	302734 302222	1241690 1242181	2105 2080	Mecha	Hullum Salam
10	Bosa (Control to GSEG03 and GSEG04)	GSEG10	7.2	312566	1217019	2129	Sekela	Gumbla

F. Rain gauges

Table 3 presents a list of the rain gauges that have been established in each micro-watershed and their location details.

Table 3 Rain gauges in micro-watersheds

Stn No.	Micro-watershed	Rain gauge name	Station ID	Easting	Northing	Elevation (m)	Woreda	Kebele
Baskura (Ribb) sub-watershed								
51	Deledel	Marie Demessey	RGBK0501	386588	1316809	2325	Farta	Zagur
52	Deledel	Dereb Tesema	RGBK0502	386093	1315926	2399	Farta	Zagur
53	Deledel	Kes Addugnaw Getu	RGBK0503	386299	1314778	2573	Farta	Zagur
54	Deledel	Blata Mereta	RGBK0504	385446	1314968	2472	Farta	Zagur
151	Worka	Asmetch Workena	RGBK1501	384001	1316497	2167	Farta	Zagur
152	Worka	Amare Alemu	RGBK1502	384709	1315517	2245	Farta	Zagur
153	Worka	Fekade Gebeyehu	RGBK1503	385326	1314982	2408	Farta	Zagur
154	Worka	Abewaw Besabeh	RGBK1504	384454	1314231	2469	Farta	Zagur
Kantai (Ribb) sub-watershed								
11	Tikkur Wuha	Terusaw Kasa	RGKT0101	406036	1301481	2876	Farta	Hawsit Asawort
12	Tikkur Wuha	Yengussie Gebeyehu	RGKT0102	406949	1300878	2977	Farta	H.Asawort
13	Tikkur Wuha	Ehitnesh Zerihun	RGKT0103	406767	1299403	3108	Farta	H.Asawort
14	Tikkur Wuha	Getasew Dessie	RGKT0104	407753	1299155	3151	Farta	H.Asawort
15	Tikkur Wuha	Kasawu Ashargie	RGKT0105	407385	1299982	3021	Farta	H.Asawort
21	Guale	Endeshaw Getinet	RGKT0201	401505	1306696	2707	Farta	Saharna Kisnat
22	Guale	Meseret Feleke	RGKT0202	401232	1306816	2743	Farta	Sa.Kisnat
23	Guale	Yemata Yalew	RGKT0203	401579	1305967	2729	Farta	Sa.Kisnat
111	Dabezute (Control)	Almaz Tesfaye	RGKT1101	399585	1307053	2738	Farta	
112	Dabezute (Control)	Ayehu Yigzaw	RGKT1102	400459	1306815	2773	Farta	

113	Dabezute (Control)	Denber Banta	RGKT1103	400284	1305578	2799	Farta	
Zefie (Gumera) sub-watershed								
61	Genametawechea	Selennat Abebaw	RGZF0601	402449	1296477	2636	Farta	Maynet
62	Genametawechea	Ehitnesh Adane	RGZF0602	403217	1296947	2739	Farta	Maynet
63	Genametawechea	Legese Mola	RGZF0603	402837	1297702	2821	Farta	Maynet
64	Genametawechea	Mengistu Zerihun	RGZF0604	406040	1298186	3112	Farta	Maynet
121	Agazo (Control)	Abeabaw Mengistu	RGZF1201	394168	1294891	2529	Farta	Tsion Mariam
122	Agazo (Control)	Taddesse Demeke	RGZF1202	394046	1293214	2716	Farta	Tsion Mariam
123	Agazo (Control)	Asmallich Walelign	RGZF1203	395827	1293702	2661	Farta	Tsion Mariam
Enkulal (Gumera) sub-watershed								
71	Enkulal	Liyu Tadesse	RGEK0701	368411	1285059	2361	Dera	Gelawed os
72	Enkulal	Kendye Tarekegn	RGEK0702	368515	1286318	2421	Dera	Gelawed os
73	Enkulal	Nigist Asnake	RGEK0703	370471	1286176	2507	Dera	Gelawed os
81	Megenagna	Lamasgen Gebeyehu	RGEK0801	390020	1285190	2501	Este	Shimagle Giorgis
82	Megenagna	Dasash Wubet	RGEK0802	391072	1285426	2542	Este	S. Giorgis
83	Megenagna	Mastewal Wonda	RGEK0803	391206	1283855	2535	Este	S. Giorgis
131	Fogeda	Deres Admasu	RGEK1301	363589	1286896	2263	Dera	Gelawdios / Shime Mariam
141	Agar	Berri Getahun	RGEK1401	359503	1285047	2346	Dera	Agar
142	Agar	Tegabo Melke	RGEK1402	360210	1285758	2320	Dera	Agar
143	Agar	Arakew Berri	RGEK1403	358482	1287613	2388	Dera	Agar
Engule (Jema) sub-watershed								
31	Washaw	Yetnebirsh Kindew	RGEG0301	315355	1224230	2678	Sekela	Gulley
32	Washaw	Belayinesh Abere	RGEG0302	315355	1224230	2678	Sekela	Gulley
33	Washaw	Getaneh Worku	RGEG0303	316044	1222938	2618	Sekela	Gulley
34	Washaw	Abeabaw Shiferaw	RGEG0304	313688	1223657	2824	Sekela	Gulley
41	Mowalele	Achameyle h Tadesse	RGEG0401	319861	1224772	2605	Sekela	Le Jambara
42	Mowalele	Tadele Mokonen	RGEG0402	321049	1225517	2689	Sekela	Le Jambara
43	Mowalele	Miheret	RGEG0403	321604	1224341	2704	Sekela	Le Jambara
44	Mowalele	Anteneh Khwalu	RGEG0404	323008	1227250	2988	Sekela	Le Jambara

91	Toma	Awoka Asmare	RGEG0901	302283	1242537	2067	Mecha	Hullum Salam
92	Toma	Tadfallech Abat	RGEG0902	302533	1241747	2103	Mecha	H.Salam
94	Toma	Zewdu Yeshambel	RGEG0903	304332	1241477	2249	Mecha	H.Salam
93	Toma	Atetageb	RGEG0904	305357	1240932	2213	Mecha	H.Salam
101	Bosa (Control)	Kes Attaley	RGEG1001	310875	1217568	2283	Sekela	Gumbla
102	Bosa (Control)	Haymanot Anelye	RGEG1002	310912	1218436	2590	Sekela	Gumbla
103	Bosa (Control)	Meseret Admasu	RGEG1003	310178	1216972	2475	Sekela	Gumbla
104	Bosa (Control)	Yitayish Getaneh	RGEG1004	310810	1218570	2401	Sekela	Gumbla

G. Equipment, activities and data collected at each station

Flow and sediment monitoring stations

Table 4 lists the equipment installed, the activities carried out and the data collected at each station.

Table 4 MMP equipment, activities and data collected (excluding rain gauges)

Station	Date station opened (metal staff gauge installed)	Equipment				Activities					Data collected				
		Staff gauge	SEBA Dipper in stilling well	Crest Stage Gauge	Secchi Jug	Manual water level observations	Automatic water level monitoring	Peak water level observation	Secchi measurements	Water sampling	Water levels (m)	Continuous water level record (m)	Peak flows (m ³ /s)	Secchi turbidity	Total Suspended Solids (mg/l)
1	1-Aug-09 (11-Feb-10)	●			●	●			●	●	●			●	●
2U	1-Aug-09 (15-Jan-10)	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2D	(9-Apr-10)	●			●	●			●	●	●			●	●
3	5-Aug-09 (?)	●			●	●			●	●	●			●	●
4	5-Aug-09 (18-Feb-10)	●			●	●			●	●	●			●	●
5	8-Aug-09 (7-Apr-10)	●	●		●	●	●		●	●	●	●		●	●
6	12-Aug-09 (11-Feb-10)	●			●	●			●	●	●			●	●
7	14-Aug-09 (25-Jan-10)	●			●	●			●	●	●			●	●
8	14-Aug-09 (27-Jan-10)	●			●	●			●	●	●			●	●
9	18-Aug-09 (3-Mar-10)	●			●	●			●	●	●			●	●

10	9-Sep-09 (16-Mar-10)	•			•	•			•	•	•			•	•
11-U	16-Sep-09 (?)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
11-D	24-Sep-09 (14-Jan-10)	•			•	•			•	•	•			•	•
12	24-Sep-09	•			•	•			•	•	•			•	•
13	31-Dec-09 (?)	•			•	•			•	•	•			•	•
14	22-Jan-10 (26-Jan-10)	•			•	•			•	•	•			•	•
15	(13-Feb-10)	•			•	•			•	•	•			•	•

H Procedures in this manual

The remainder of this manual consists of a number of documents, presented as annexes, that describe procedures for carrying out tasks such as collection specific types of data. Some procedures are to be carried out by station managers; others by BoWRD staff. The aim of the procedures is to serve as an *aide memoire* to existing project staff and as a training resource for new project staff. The annexes are not the only training documents produced by the project, but they are most of them.

Table 5 lists the procedures and their main contents and who should use them.

Table 5 Annexed procedures and their users

Annex	Title	Contents	Users
1	Data collection instructions given to station managers (English and Amharic versions)	- Description of MMP microwatershed monitoring programme - Instructions for collecting rainfall, water level, secchi turbidity and water samples. - Instructions for collecting other data and storing the information.	- Station managers - BoWRD water resources staff to use to train Zonal and Woreda staff and new station managers.
2	MMP Data collection sheet for Station Managers (in English and Amharic)	Data recording sheet for weather, water level, secchi turbidity, water sample number, rainfall and other observations.	- Station managers - BoWRD water resources staff to use to train Zonal and Woreda staff and new station managers.
3	Steps for Quality Assurance and routine time schedule for the MMP	- Outlines the points at which errors in data collection and recording can be made. - Sets out a monthly routine for data collection and data entry onto computer.	BoWRD water resources staff
4	Procedure for measuring stream flow with a current	Describes the velocity-area method for	BoWRD water resources staff

	meter	measuring stream flow.	
5	Procedure for measuring stream flow with a float	Describes the float method for measuring stream flow.	- BoWRD water resources staff - Zonal Experts - Woreda Experts
6	Procedure for operation of SEBA Dippers for continuous water level monitoring	Describes: - Installation of SEBA (Dipper-3) software - Installation of Dipper-3 hardware drivers - Field installation of Dipper-3 - Operation of the SEBA software and Dipper-3 logger.	BoWRD water resources staff
7	Procedure for use of crest stage gauges to estimate peak flood flows	Describes: - The crest stage gauge - The equations used (the discharge equation and the flow resistance equation) - Choice of site - Installation of crest stage gauges - Survey of cross sections - Sample of bed material - Operation of crest stage gauges in the field - Office procedure - Use of an Excel spreadsheet to calculate flood estimates.	BoWRD water resources staff
8	Procedure for use of the DH-48 suspended sediment sampler	Describes: - The purpose of the DH-48 sampler - Choice of cross section - Sampling method.	BoWRD water resources staff
9	MoWR laboratory procedure for analysis of suspended sediment concentration	Describes: - Apparatus - Reagents - Procedure	Soil Laboratory staff

Annex 1

Data collection instructions given to station managers (English and Amharic versions)

Microwatershed Monitoring Programme

This is your watershed and your river!

The TBIWRDP will be working with you on the issue of protection of your natural resources, your water resources and your watershed. The B1 component will be focusing on the protection of the watersheds through various activities, such as terracing, bunds, gulley rehabilitation and other methods.

We are here to make sure that the watershed development activities are having a favorable impact on the inhabitants and the watershed.

One aspect of this is environmental monitoring.

We will monitor the environment in many ways, and one of them includes Microwatershed Monitoring.

This means that environmental monitoring sites have been established in your watershed, with the help of Development Agents, Woreda Experts and regional experts. Local people have been consulted in local knowledge, such as water levels during the rainy and dry season, accessibility etc.

The monitoring programme requires that one person is employed to take care of the station and take daily measurements in the field. This work is very important, and requires a careful and responsible person. It is important to collect the data every day, exactly as instructed, and enter each observation meticulously in the data sheets and notebooks provided. The data collector will also be trained to take water samples from the river. These samples will be analyzed by the BoARD.

Data collection - instructions

Data should be collected at a minimum twice daily, at seven o'clock in the morning and evening. In the event of heavy rain, extra observations should be taken from the river, at one hour intervals, until the rain has stopped and the river water is coming down.

When in the field, always use the pencil provided to you. This is because ink pen will smudge if the paper becomes wet, e.g. if it falls into the river or the ground, or the rain wets it. Always only take clean data sheets with you to the river (not the old, filled in ones). Do not take the notebook to the river. Always write in your observations into the datasheet while still at the site – do NOT rely on your memory. Check your water level reading at least twice.

1. Measuring rainfall

The rain gauge should be in place **at all times**, also when it is not raining.

The rain gauge should be **cleaned** from any debris, and washed with soap and water at least once a week. This is to prevent algal growth at the bottom, which will affect your readings.

Read the rain gauge every day, before going to the river.

1. Take the container carefully out of the rain gauge.
2. Make sure you hold the container exactly vertical. If you tilt the container, your reading will be wrong.
3. Read the measurement (mm) on the container.
4. Mark the exact reading into the datasheet (e.g 2 mm)
5. Empty the container completely, by shaking out all the drops of water
6. Replace the container immediately

In case of heavy rain, remember to check the container often to prevent overflow. Every drop of rain falling upon the rain gauge should be recorded, and even in one second many drops will fall!

If the container is more than half full, you should read it in the rain, mark down the mm's on a new datasheet, quickly empty the container and replace it to collect more rain. Remember NOT to keep an umbrella close to the rain gauge when you are reading it in the rain!

In case of heavy rain like this, you should go to the river and collect extra samples. Mark all the data into this new data sheet. Remember to indicate the time when you are making the extra sampling.

2. Estimation of water level, using the staff gauge

When coming to the river, first estimate the water level height (see separate instruction). If you cannot see any markings, draw a picture of how high the water is (using e.g. stones, bushes or trees as a marker). Write down also if you know whether the water is receding or going up. Mark also whether there is rain at the moment, or if it has rained during the night. Make special notes regarding heavy rainfall and e.g. flash floods, if you are sure they have occurred.

3. Measuring of secchi turbidity

Select a site close to the staff gauge, where the water is running freely and is turbulent. Do not collect any samples in still standing water, where the sediment has had time to settle. Wade into the river and move carefully upstream. Make sure that the sediment that is stirred up by your movements does not affect the area where you take the sample). After this, you take the secchi sample as follows:

1. Reach forward (upstream) and fill the secchi can completely.

2. Lift it out of the water, and turn so that your shadow completely covers the instrument.
3. Look down straight from above into the water.
4. Count the number of white dots that you can see in the secchi can.
5. Mark the number of dots on the datasheet
6. Repeat the sampling and the reading. Make sure your first reading was correct.

Make sure that you read the secchi sample immediately. This is because the sediment will start settling immediately, and if you wait, your reading will not be correct. Do NOT use the secchi sample to fill the water sample (see below).

4. Collection of water from the river

When the secchi is less than 8 you should collect a water sample. A secchi measurement less than 8 means that there is a lot of colour in the water caused by a high sediment content,. Follow the instructions carefully:

1. When the water level is high, use a bucket with a rope to collect the sample from the middle of the current.
2. When water level is low enough to allow wading, wade to the middle of the river
3. Check that your movements from taking the secchi sample will not affect your sample
4. Check that there are no cattle etc immediately upstream (50 m or less), stirring up sediment into the water.
5. Stand facing upstream, and collect some water into the sampling bottle.
6. Rinse the sampling bottle with the river water, and through the rinsing water downstream. Repeat three times. Cleaning the bottle is very important, since they are second hand. You should always use the river (sampling) water for the cleaning, never any other water.
7. Lower the sampling bottle into the water, keeping it slightly tilted upstream. If there is too little water to keep it upright, let the bottle face upstream.
8. Fill the bottle completely, and screw the lid on while submerged.
9. When you arrive at your house, copy the information from the data sheet onto the dry bottle. Mark the bottle with Station number (e.g. St 6), the date (e.g. 12.4.2002), time (or) and the initials of the collector (e.g. E.M). Also mark the secchi depth on (e.g. S=4). Do NOT mark any additional information – this should be on the data sheet. Seal the cap with tape to ensure that no water leaks out.
10. Keep the samples always standing upright, dry and out of reach of children.

Other observations

Every time you visit the station, take note of your environment. Note into the data collection sheet if there has been heavy storms, winds or other unusual phenomenon. If possible, make walks upstream of the station, and mark down if there have been e.g. changes in the river course (bank erosion). Mark down any observations that you think may affect the water quality and the amount of sediment in it.

Storing the information

The information you collect is very important. Make sure to take care when reading measurements, and recording them. When you return home, transfer the information from your data collection sheet into the note book provided to you. Check that all the information is exactly the same as in your data sheet. Do NOT rely on your memory! Keep the notebook at a safe place at home (dry, safe from children etc).. Remember always to date everything consecutively. Always rather mark down more information, than less information.

Keep the filled data collections sheets in the plastic folder provided to you. Send the sheets with the corresponding set of water samples to Bahar Dar with the collectors from the BoARD / BoWRD.

Keep the water bottles ALWAYS UPRIGHT. Take special care not to let the samples tilt. Use the tape provided to you to seal the caps, after tightening them hard. Always mark the bottles immediately when you return home. Keep the bottles in a dark and cool place until they are collected.

በህብረተሰብ ተሳትፎ ላይ የተመሠረተ የህይድሮሎጂ መረጃ አሰባሰብ መመሪያ

ይህ የአካባቢው ተፋሰስ እና ወንዝ ነው

የጣናበለስ የተቀናጀ የተፋሰስና የውሃ ሀብት ልማት ፕሮጀክት በሥሩ በርካታ ንዑስ ፕሮጀክቶች ሲኖሩት ከነዚህ ውስጥ አንዱና ዋነኛው በተፋሰሱ ውስጥ ያሉ የተፈጥሮ ሀብቶችን (ውሃ፣ አፈር፣ ደን እና ሌሎች ዕፀዎች፣ ብዝሃ-ህይወት) በማልማትና በመንከባከብ ላይ የተመሠረተው ነው። ይህም ፕሮጀክት B1 ፕሮጀክት በመባል ይታወቃል። በፕሮጀክቱ የተፋሰስ ልማት የሚሠሩ ሥራዎች እርከን፣ ክትር፣ ዛፎችንና ልዩ ልዩ ዕፀዎችን በተፋሰስ መሬት ውስጥ መትከል፣ ማልማትና መንከባከብ ነው።

በዚህ ንዑስ ፕሮጀክት ሥር የተፋሰሱን ልማት ሥራዎች ውጤታማነት በተመለከተ ክትትልና ግምገማ የሚደረግበት የፕሮጀክቱ ክትትልና ግምገማ ክፍል አለ። ክትትልና ግምገማ ማለት በተፋሰሱ የሚሠሩ ሥራዎች ከሃይድሮሎጂ፣ ከተፈጥሮ ሀብትና ከሶሻል-ኢኮኖሚ አኳያ የሚገኙ ለውጦች ምን ያህል ውጤታማ እንደሆኑ ክትትል የሚደረግበት የሥራ ዘርፍ ነው። ይህ መመሪያ ከተፋሰሱ የሃይድሮሎጂ ሁኔታ መለወጥ አኳያ የሚኖረውን ለውጥ ለመከታተል እንዲቻል ታስቦ የተዘጋጀ የቴክኒክ መመሪያ ነው።

ይህ ተፋሰስ የሃይድሮሎጂውን ሁኔታ ለመከታተል ተብሎ በመስኩ ከፍተኛ ባለሙያዎች፣ በወረዳው የግብርናና ገጠር ልማት ባለሙያዎች እና የአካባቢው ህብረተሰብ መግባባትና ስምምነት የተመረጠ ተፋሰስ ነው።

ለሃይድሮሎጂው ክትትልና ግምገማ ሥራ በንዑስ ተፋሰሱ ማኒፂያ (ማብቂያ) ቦታ ላይ የተገጠመውን መለኪያ መሣርያ የሚከታተል ሠራተኛ ያስፈልጋል። ሥራው ጥንቃቄ የሚጠይቅና በመመሪያው መሠረት መረጃዎች የሚሰበሰቡበት ነው። የሃይድሮሎጂ ጣቢያ ሠራተኛ ስለአሠራሩ፣ መረጃ አሰባሰቡና እና ክትትሉ ሥልጠና ይሰጠዋል። ሠራተኛው ከመሣርያ ንባብና ምዝገባ በተጨማሪም የጎርፍ/ውሃ ፍሰት ናሙና ይወሰዳል። የተወሰደው የጎርፍ/ውሃ ፍሰት ናሙና ለምርመራ ወደ ግብርናና ገጠር ልማት ቢሮ ባህር ዳር ይወሰዳል።

የመረጃ አወሳሰድ መግለጫ

መረጃ የሚወሰደው ከጧቱ አንድ ሰዓትና ከምሽቱ አንድ ሰዓት በቀን ሁለቱ ነው። ከባድ ዝናብ ከዘነበ ደግሞ ዝናቡ ከጀመረበት ጊዜ ጀምሮ በአንድ ሰዓት ልዩነት ዝናቡ እስከሚያቆምበትና የውሃው ፍሰት ከዝናብ በፊት እስከነበረበት ሁኔታ ድረስ አልፎ አልፎ ይወሰዳል።

በመስክ ላይ ሳለህ ለመፃፊያ የተሰጠህን ደረቅ እርሳስ ተጠቀም። ዝናብ ወይም ውሃ ስለሚያረጥበው እስክሪፕቶን ለዚህ ሥራ መጠቀም አይቻልም። ሁሌም ንፁህና ያልተሞሉ የመረጃ መሰብሰብያ ፎርማቶችን ተጠቀም። የማስታወሻ ደብተርህን ወደጣቢያ አትውሰድ። የሚያስፈልገውን መረጃ ሁሉ ተዘጋጅቶ በተሰጠህ ፎርም ላይ በወንዙ/ጣቢያው ላይ እንዳለህ አስፍር። መረጃዎችን በጭንቅላትህ ይዘህ በኋላ ለመሙላት አትሞክር። የወንዙን/የጎርፉን የፍሰት መጠን ከጌጁ ላይ በጥንቃቄ አስተውለህ በፎርሙ ላይ አሥፍር።

1. የዝናብ መጠንን መለካት

የዝናብ መጠን መለኪያ ሬንጌጅ ሁልጊዜም (ዝናብ በሚዘንብበትና በማይዘንብበት) ጊዜ ሁሉ በቦታው መኖር አለበት። ሬንጌጁ በሳምንት አንድ ጊዜ በውስጡ ከተጠራቀመው ቁሻሻ ወይም ዝቃጭ መፅዳት ይኖርበታል። ይህም የተፋለሰ የዝናብ መጠን መረጃ እንዳይወሰድ ለመከላከል ነው።

ሁሌም በየቀኑ ወደወንዙ ከመሄድህ በፊት ሬንጌጁን አንብብ። ለዚህም፦

1. ሬንጌጁን በጥንቃቄ ከማስቀመጫው ላይ አንሳ
2. ንባቡን ስትወስድ ሬንጌጁን 90 ዲግሪ ቀጥ አድርገህ መያዝህን አረጋግጥ። ይህም በሬንጌጁ ማጋደል ሊከሰት የሚችለውን የተሳሳተ ንባብ ለማስወገድ ነው።
3. ከቲዩቡ ላይ በውሃው ልክ አኳያ ያለውን ንባብ በሚሊ ሚትር ውሰድ
4. በሚሊሜትር የወሰድከውን ንባብ በፎርሙ ላይ በቦታው አሥፍር (ፃፍ)
5. ከመዘገብክ በኋላ ሬንጌጁ ውስጥ ያለውን ዉሃ ድፋው። ሬንጌጁን ወደታች አድርገህ በማወዛወዝ ዉሃውን አጠንፍፈው።
6. ከዚያም ሬንጌጁን ወደቦታው መልስ

ምናልባት ከፍተኛ ዝናብ ከዘነበ ሬንጌጁ ሞልቶ ሊፈስ ስለሚችል ተከታትሎ ማየት ያስፈልጋል። በሬንጌጁ የሚገባ ማናቸውም የዉሃ ጠብታ መረጃ መወሰድ ይኖርበታል።

በዝናብ ወቅት ሬንጌጁ ከግማሽ በላይ ውሃ ከተጠራቀመበት ቶሎ ብለህ መረጃውን በሌላ ወረቀት ውሰድና ሬንጌጁን ባዶ አድርገህ በቦታው መልስ። ወደሬንጌጁ የሚገባውን ውሃ ላለመጋረድ ጃንጥላ ወይም ሌላ ከለላ ነገር ይዘህ ወደሬንጌጁ አትጠጋ።

ሬንጌጃ በፍጥነት የሚሞላበት ሁኔታ ከተከሰተ ቶሎ ብለህ ወደወንዙ በመውረድ ተጨማሪ የውሃ ፍሰት መረጃና ናሙና ውሰድ። ሁሌም መረጃውን በአዲስ ፎርም ላይ አስፍር። ተጨማሪ መረጃ እና ናሙና የወሰድክበትን ሰዓት በተገቢው ቦታ ላይ መመዝገብ እንዳትረሳ።

2. የስታፍ ጌጃን ንባብ መመልከትና መመዝገብ

ወደወንዙ ስትመጣ በስታፍ ጌጃ ላይ የውሃውን ከፍታ በጥምና አስተውል። ለዚህ አስተውሎት እንዲረዳህም ተጨማሪ የሃይድሮሎጂ ማብራሪያውን ተመልከት። ምናልባት ስታፍ ጌጃ በጎርፍና በሌሎች ምክንያቶች ከቦታው የተነቀለና የተዛነፈ ከሆነና የውሃ/የጎርፍ ወለል ከፍታ ለመመዝገብ አዳጋች መስሎ ከታየህ በቦታው ላይ ያሉትን የድንጋይ፣ የእንጨት ሥሮች/ግንዶችን፣ የአፈር ሁኔታዎችን ምልክት በመውሰድና በወረቀቱ ክፍት ቦታ ላይ በመሳል የውሃውን ከፍታ ለማመልከት ሞክር። በዚህ ጊዜም ቶሎ ብለህ በአካባቢው ላሉ የግብርና ልማት ባለሙያዎች ሁኔታውን በማሳወቅ ስታፍ ጌጃ በቦታው እንዲተከል አድርግ። ስታፍ ጌጃ በተወሰደበት ወቅት ያለውን የዝናብ ሁኔታ እንዲሁም ሌሊት ወይም ቀን ላይ ከፍተኛ ዝናብ ዘንቦ ከሆነና ደራሽ ውሃ ተከስቶ እንደሆነ መረጃ ውሰድ።

3. የሴቺ ንባብ አወሳሰድ

በስታፍ ጌጃ አካባቢ በሴቺው ናሙና ለመውድ የሚያስችል ምቹ ሥፍራ ምረጥ። የሴቺ ናሙና የሚወሰድበት ቦታ የሚወርድ ውሃ እንጂ የረጋ ውሃ የሚታይበት መሆን የለበትም። ይህም የረጋ ውሃ ደለል የሚዘቀጥበት እንጂ ደለል የሚጓጓዝበት ስላልሆነ ነው። ሴቺ ዲስኩን በመያዝ ቀስ ብለህ ከታች ወደላይ በጥንቃቄ በመራመድ አስተማማኝ የውሃ ፍሰት ያለበት ቦታ ድረስ መደረስ። የሴቺ ናሙናውን ስተወስድ በእግርህ የደፈረሰውን ውሃ እንዳትወስድ ጥንቃቄ አድርግ። ከዚህ ቀጥሎ በተገለፀው መሠረት የሴቺ ናሙናውንና ንባቡን ውሰድ።

1. ፊትህን የውሃው ፍሰት ወደሚመጣበት አቅጣጫ በማድረግ የሴቺ ጆጉን ወራጅ ውሃው ውስጥ ጠልቀህ በውሃ ሙላ
2. በወራጅ ውሃ የተሞላውን ሴቺ ዲስክ ወደላይ በማውጣት የሰውነትህ ጥላ በማይጋርድበት ሁኔታ ዞር አድርገህ በብርሃን ላይ መያዝ
3. የሴቺ ዲስኩን ከላይ ወደታች በመመልከት ተሰልፈው የሚታዩትን የሴቺ ዲስኮች እስከታየህ ድረስ ከላይ ወደታች መቁጠር
4. የታዩህን የሴቺ ዲስኮች ቁጥር በተመለከተው ፎርም ላይ አስፍር
5. የውሃ መቅዳቱንና ንባብ መውሰዱን ሥራ በድጋሚ በማካሄድ መረጃው/ንባብህ ትክክል መሆኑን አረጋግጥ

ሴቲ ዲስኩን ጠልቀህ እንዳወጣህ ደለሉ ሳይዘቅጥ ንባቡን ወዲያውኑ መውሰድ ይኖርብሃል። ለላቦራቶሪ የሚላከውን የጎርፍ/ወራጅ ውሃ ናሙና መያዣ ላስቲክ የሴቲ ዲስኩን በመጠቀም አትመላ።

4. ለላቦራቶሪ ምርመራ ወደባህዳር የሚላከውን የጎርፍ/ወራጅ ውሃ ናሙና አወሳሰድ

የሴቲ ንባቡ ከ8 ያነሰ ከሆነ ናሙና መውሰድ ይኖርብሃል። የሴቲ ንባቡ ከ8 አነሰ ማለት ጎርፉ ተሽክሞት የሚጓጓዝ የደለል ጭነት አለ ማለት ነው። ለላቦራቶሪ የሚላከውን የጎርፍ/ወራጅ ውሃ ናሙና ለመውሰድ ከዚህ ቀጥሎ ያለውን በቅደም ተከተል አከናውን።

1. የወንዙ የውሃ ፍሰት ከፍተኛ ከሆነና ወደወንዙ መሐል ለመግባት አስቸጋሪ ከሆነ ገመድ ባልዲ ላይ በማሠርና ወደወንዙ መሐከል በመወርወር ናሙናውን ለመውሰድ ሞክር
2. የወንዙ የውሃ ፍሰት አነስተኛ ከሆነና ወደመሐሉ ለመግባት የሚቻል ከሆነ በጥንቃቄ ወደወንዙ መሐከል ተራመድና ግባ
3. በሴቲ ዲስክ የወሰድከው ናሙና ይኸኛውን ናሙና የሚያዛባ እንዳይሆን ጥንቃቄ አድርግ
4. ፊትህን ወደወንዙ መምጫ አቅጣጫ አዙርና በ50 ሜትር ርቀት ውስጥ ከላይ ከብት ውሃ እየጠጣና ወንዙን እያደፈረሰ አለመሆኑን አረጋግጥ
5. የናሙና መውሰጃ ፕላስቲኩን በሚወርደው ውሃ ውስጡንና ውጭውን ጭምር አለቅልቅና አፅዳው። ይህም የናሙና መውሰጃው ፕላስቲክ ከዚህ በፊት አገልግሎት ላይ የዋለ ሊሆን ስለሚችል ከደለልና ልዩ ልዩ ዝቃጭ መፅዳት ስላለበት ነው። ፕላስቲኩን ለማፅዳት ከወንዝ ውሃው ሌላ ፈሳሽ በፍፁም አትጠቀም።
6. ፊትህን ወደወንዙ መምጫ አቅጣጫ አዙርና የፕላስቲክ ጠርመሱን ከሚወርደው ጎርፍ/ውሃ ውስጥ በቁመቱ ጋደል በማድረግና ውሃ እንዲገባው በማድረግ ናሙና ውሰድ። የናሙና ጠርመሱን ለማጥለቅ የውሃው ጥልቀት አነስተኛ ከሆነ የፕላስቲኩን አፍ ወደውሃ/ጎርፍ መምጫ አቅጣጫ በማስተኛት ናሙና ውሰድ።
7. ፕላስቲኩን በደንብ መላውና በወራጅ ውሃው ውስጥ እንዳለ አጥብቀህ ክደነው።
8. እቤትህ ስትደርስ ከመረጃ ፎርም ላይ መረጃውን ወደጠርመሱ አስተላልፍ። ፕላስቲኩን የጣቢያውን ቁጥር (ለምሳሌ ጣቢያ ቁጥር 6)፣ ቀኑን (ለምሳሌ 12.04.2002)፣ ጊዜውን (ጠዋት ወይም ማታ)፣ የናሙና ወሳጁን ስም፣ (ለምሳሌ ካ.ማ) በማድረግ አመልክት። በተጨማሪም የሴቲ ቁጥሩን (ለምሳሌ S = 4) በማለት ጠርመሱ/ፕላስቲኩ ላይ ፃፍ። ከዚህ ሌላ ተጨማሪ መረጃ ፕላስቲኩ ላይ አትፃፍ ወይም አታስተላልፍ። ቀሪው መረጃ በመረጃ ፎርም ላይ እንዳለ ይሁን። የጠርመሱን ክዳን በስኩዋሽ ቴፕ ወረቀት አሽግ።

9. ናሙና የተወሰደበትን ፕላስቲክ ስታንጉዝም ሆነ ስታስቀምጥ ቀጥ ብሎ እንዲቀመጥ አድርግ

ሌሎች ዕይታዎች

በወንዙ መረጃ በምትወስድበት ማናቸውም ጊዜ ስለአካባቢው የተለየ ሁኔታ መረጃዎችን ውሰድ። በመረጃ መሰብሰቢያ ፎርም ላይ ስለነበረው ከፍተኛና ንፋስ የቀላቀለ ዝናብ መረጃውን አስፍር። ከተቻለም ከጌጂንግ ጣቢያው ወደላይ ትንሽ እርምጃዎችን በመሄድ በጎርፍ የተደረመሰ አፈር፣ የውሃ መንገድ ወይም ቦረቦር ካለ ግለፅ። የጎርፍ ውሃውን የደለል ጭነት መጠን የቀየረ ሁኔታ ካለ ግንዛቤ በመውሰድ በፎርም ላይ አስፍር።

መረጃውን ማጣራት

የወሰድከው መረጃ ለተፋሰስ ልማት እጅግ ጠቃሚ መሆኑን ተገንዝብ። መረጃዎችን ስታነብና ስትፅፍ ከፍተኛ ጥንቃቄ አድርግ። ከወንዙ ጣቢያ ወደቤት ስተመለስ መረጃዎችን ከመረጃ መሰብሰቢያ ፎርም ላይ ወደተሰጠህ ማስታሰቢያ ደብተር በጥንቃቄ አስተላልፍ። ሁሉም መረጃ በመረጃ ማሰባሰቢያ ፎርም ላይ እንደሰፈረው ተመሳሳይ መሆኑን አረጋግጥ። በጭንቅላትህ በያዝከው መረጃ ላይ አትተማመን። የማስታወሻ ደብተርህን እርጥበት በማይኖርበትና ልጆች በማይደርሱበት ሁኔታ አስቀምጥ። ሁልጊዜ ቀናትን በተከታታይና በትክክል መፃፍህን አረጋግጥ። ሁልጊዜም ትንሽ መረጃዎችን ከመያዝ ተጨማሪ መረጃዎችን በማካተት ላይ አተኩር።

የተሞላውን የመረጃ መሰብሰቢያ ፎርም በተሰጠህ የወረቀት መያዣ ፕላስቲክ ውስጥ አኑር። የተሞላውን የመረጃ ፎርም ከጎርፍ/ውሃ ናሙናው ጋር ወደባህርዳር ለግብርና ቢሮ ወይም ለውሃ ቢሮ እንዲላክ አድርግ።

ናሙና የተወሰደበትን ፕላስቲክ ስታንጉዝም ሆነ ስታስቀምጥ ቀጥ ብሎ እንዲቀመጥ አድርግ። ናሙና የተሞላው ፕላስቲክ እንዳይጋድልና ውሃው እንዳይፈስ ጥንቃቄ አድርግ። የጠርሙሱን ክዳን በደንብ ከገጠምክ በኋላ በተሰጠህ ስኩዋሽ ቴፕ ወረቀት በደንብ አሸግ። እቤትህ ስትደርስ ከመረጃ ፎርም ላይ መረጃውን ወደጠርሙሱ አስተላልፍ። ጎርፍ/ውሃ የተሞሉትን ፕላስቲኮች እስኪጓዝሉ ድረስ ፀሐይና ሙቀት በማይደርስበት ሥፍራ አኑር።

Annex 2. MMP Datasheet, in English and Amharic

Tana Beles Integrated Water Resource Development Programme

Microwatershed Monitoring Programme - Data Recording Sheet

[illegible]

¹ Make a note specifically on heavy rain events in the watershed, storms, floods or drought

² Each sample must be marked with at least the following information: Date, time, collectors initials and the secchi reading.

የጣና በለስ የተቀናጀ የውሃ ሃብት ልማት ፕሮግራም የአካባቢ ሃይድሮሎጂ ሁኔታ መከታተያ ቅፅ

የመዝጋቢው ስም:			የጣቢያው ኮድ:	
ቀን:				
የአየር ሁኔታ:				
የስታፍ ጌጅ ንባብ:	ሴ ሜትር ሰታፍ:		ሃሮጌ	
የሴፔ ንባብ:	1	2	3	
የናሙና ኮድ:				
የዝናብ መጠን:	ሚ.ሜትር:			
ሌላ አስተያየት:				
የመዝጋቢው ስም:			የጣቢያው ኮድ:	
ቀን:				
የአየር ሁኔታ:				
የስታፍ ጌጅ ንባብ:	ሴ ሜትር ሰታፍ:		ሃሮጌ	
የሴፔ ንባብ:	1	2	3	
የናሙና ኮድ:				
የዝናብ መጠን:	ሚ.ሜትር:			
ሌላ አስተያየት:				

1. በአካባቢው ተፋሰስ የተከሰተውን እጅግ ከፍተኛ የዝናብ መጠን፣ የጎርፍና የድርቅ ሁኔታ ላይ አስተያየት።
2. በእያንዳንዱ የናሙና መያዣ ላይ ቀን፣ ጊዜ፣ የናሙና ወሳጅ ስም እና የሴፔ ንባብ መፃፍ አለበት።

ANNEX 3

QUALITY ASSURANCE STEPS AND ROUTINE TIME SCHEDULE FOR THE MMP

The MMP data involves a number of moments when errors may enter the data. These include:

1. **In the field:** If the site manager is not properly trained, he may make mistakes in the field. The sources of error may vary from incorrect sampling techniques, incorrect reading of staff gauges, incorrect labeling of samples or incorrect information entered into the data sheet, or the notebook.
2. **During pick-up:** If the data sheets and the note book are not checked properly, mistakes may be overlooked. At the time of pick-up, each recording must be checked, and if there are any questions these should be made to the site manager when he/she still remembers what happened on that date. Check especially if the staff gauge readings look correct; if not, check the site manager AT THE STAFF GAUGE.
3. **During transport:** If the samples are handled incorrect, the bottles may leak. Make sure you pack the samples well in the car, and drive carefully.
4. **At the soil laboratory:** The soil laboratory is analyzing the samples, and they note down all the various steps of the analyses in their own data sheets. The calculations must be checked by MMP staff before entering into the database.
5. **During punching in of data:** After someone has punched in the data, another staff member should help in the checking of the data. This means, ALL data must be checked at least once for punching mistakes.
6. **During analyses of data:** Make sure about outliers, mistakes in punched in data by drawing simple graphs in excel.

The entire MMP relies on timely pick-up of data, to keep the site managers motivated to work, and re-trained (hands-on, in the field) at a routine basis. This requires time and effort during the pick-ups.

The routine work for the MMP requires at least one, preferably two, people. Two people can manage it comfortably according to the schematic table below. The data punching and subsequent QA must take place routinely every month.

Routine work in MMP, general monthly schedule:

	Week 1	Week 2	Week 3	Week 4	Week 5
MMP 1	Pick-up Sekela, QA raw data	Pick-up Farta, QA raw data	QA punched in Sekela data	QA punched in Farta Data	QA soil data
MMP 2	Current meter measurements	Punch in Sekela	Punch in Farta, get reslts from lab, QA lab	Punch in soi data	Data analyses

ANNEX 4

PROCEDURE FOR STREAM FLOW MEASUREMENT USING A CURRENT METER

1 Purpose

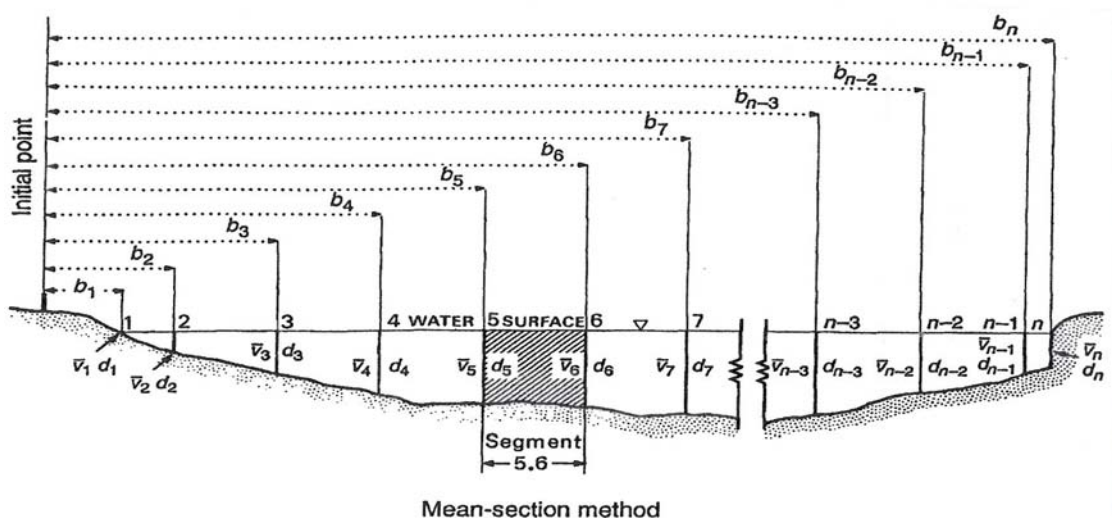
Discharge (flow rate) measurements in streams are required for planning and design of water resources engineering structures and environmental (hydrological) baseline studies. Measurement of the flow rate in streams in the project area will utilize the velocity-area method. This involves the use of a current meter. Measurements are also made of the width and depth of the channel to calculate the cross section area of flow (A). Flow ($Q, m^3 s^{-1}$) is computed by:

$$Q = V.A \quad (m^3 s^{-1}) \quad \text{Equation 1}$$

2 Theory of the mean section method

In practice the stream cross section at the gauging site is divided up into a number of sub-sections as shown in Figure 1.

Figure 1 Schematic view of the mean-section method of measuring discharge



The discharge is computed through each sub-section between successive verticals. The depth is measured at each vertical, averaged and multiplied by the width of the sub-section to obtain the cross-section area of each sub-section in turn. The velocity is measured at one or two points at each vertical in turn to obtain an estimate of the average velocity at each vertical. The average sub-section velocity is computed as the average of the velocity at the two verticals. The average velocity for each sub-section is then multiplied by the cross section area of each sub-section to compute the discharge through each sub-section. The total stream discharge is the sum of all the sub-section discharges. Referring to Figure 2, the discharge passing through sub-section 5-6 is computed as:

$$q_{5-6} = \left[\frac{(v_5 + v_6)}{2} \right] \cdot \left[\frac{(d_5 + d_6)}{2} \right] \cdot (b_6 - b_5) \text{ m}^3 \text{ s}^{-1} \quad (\text{Equation 2})$$

where:

- q_{5-6} = discharge through sub-section 5-6 ($\text{m}^3 \text{ s}^{-1}$)
- v_5 = mean velocity at location 5 (m s^{-1})
- b_6 = distance from initial point to vertical 6 (m)
- d_5 = depth of water at location 5 (m).

The summation of the discharges for all the sub-sections is the total discharge of the stream.

3 Equipment

The equipment required to estimate flow using the velocity-area method includes:

- depth measuring equipment (graduated wading rod)
- width measuring equipment (15 m measuring tape)
- current meter
- This procedure document, field book, and data forms.

4 Safety

Relevant site safety procedures are to be followed, and this task should undergo risk assessment as per mine/company policy. As this method involves entering the stream, this should only be conducted when stream flow rates are low enough to be safe, and the footing is firm. Appropriate footwear should be worn – wellington boots or waders depending on water depth. A second person should be present to raise the alarm/provide assistance in case of an incident.

5 Selection of gauging site

The gauging site should be chosen on the basis of the following criteria:

- The cross section should be located on a straight reach of channel which is of uniform cross section where flow is parallel with the channel banks and there are no upstream flowing eddies or deadwater zones.
- Water depth should be sufficient for effective immersion of the current meter.
- The channel should be clear and unobstructed by trees, aquatic growth or other obstacles.
- The bed and banks should be stable and not subject to significant erosion or sedimentation.

- All discharges, even high flows, should be contained within a definite channel or channels having stable boundaries and well-defined geometric dimensions.
- Sites subject to backwater effects by downstream obstacles should be avoided.

6 Number of verticals

Table 1 provides guidelines for the number of verticals, based on channel width. In general verticals should be spaced so that no sub-section should contain more than 10% of the total flow and ideally no more than 5% of the total flow.

Table 1 Recommended spacing of verticals

Channel width (metres)	Number of verticals
0-0.5	3-4
0.5-1.0	4-5
1.0-3	5-8
3-5	8-10
5-10	10-20
>10	>20

7 Velocity measurements in the vertical

Table 2 provides guidelines for the number of velocity measurements to be made in each vertical in order to obtain an estimate of the mean velocity at the vertical. D = depth, V = mean velocity in the vertical, V_n = velocity at the fraction n of the depth (D) from the surface.

Table 2 Recommended number of velocity measurements in the vertical

Water depth D (metres)	Number of velocity measurements in each vertical	Position of velocity measurement in vertical from river bed
<0.5	1	0.4D
>0.5	2	0.2D and 0.8D

Set the position of the current meter on the wading rod to measure from the bed upwards.

8 Gauging procedure

- 1) Select the gauging site according to the criteria in Section 5.
- 2) Prior to actual measurement, general site information such as weather conditions, channel and/or flow conditions, and time of day shall be noted.
- 3) Fix a measuring tape across the cross section using pins or stones, placed at right angles to the direction of flow. Ideally the zero on the tape should be on the left bank (looking downstream). Work from the left bank to the right bank. This may not always be possible and need not be adhered to.
- 4) Record the data as necessary onto the 'Stream flow gauging' record form (Annex). Observations and data should be recorded in a separate sheet for each location.
- 5) Decide on the spacing of the verticals according to the criteria in Table 1. Normally the verticals will be equally spaced across the cross section, but need not be. Record the distance on the tape of each vertical and the distance from the left (or right) bank (water's edge).
- 6) Record the depth of water at each vertical using the wading rod (in metres to the nearest 0.01m).
- 7) Select the method of velocity measurement (ie. two-point for depths greater than 0.5 m or the one-point (0.4D) method for flow depths less than 0.5 m).
- 8) Compute the depth at which to set the meter based on the particular velocity method used and total depth at the vertical point. Place meter at required observation depth (0.2 and 0.8 of the depth measuring from the river bed for the two-point procedure, 0.4 of the depth from the bed for the one-point procedure).
- 9) After the meter is in position, permit it to become adjusted to the current prior to the velocity measurement. This may typically take 10 seconds. Record the number of propeller revolutions over a 60 -second period. Record the number of propeller revolutions at the observation depth on the form.
- 10) Move to each of the verticals in turn and repeat this procedure; record the distance from the starting point, total depth, observational depth and number of propeller revolutions at required observation depth, until the entire cross section has been traversed.

9 Discharge calculations

Follow the guidance in Section 2.

Each sequence of flow measurements will be recorded onto 'Streamflow gauging record form' (see Annex). This data should then be transposed onto the Excel version of this form, which will automatically calculate the total stream discharge for the given measurements. This document should be saved with a filename specific to the monitoring location and date. Do not overwrite the original document.

ANNEX Streamflow gauging record form

Streamflow gauging record form														
Monitoring location:						GPS data								
Date:						Northing:								
Time:						Easting:								
Staff gauge (m):						Elevation:								
Measuring Period (seconds): 60														
Vertical / Sub-Section	Dist on Tape m	Width of Sub-section m	Depth at Vertical m	Area Subsection m ²	Observational Depth (0.4D etc) m	No. of Revs in Meas. Period	No. of Revs / sec n	Velocity at point m/s	Mean Vert. Velocity m/s	Mean Sub. Sect. Velocity m/s	Discharge m ³ /s	Observations, incl sediment samples		
1		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
2		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
3		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
4		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
5		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
6		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
7		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
8		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
9		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
10		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
11		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
12		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
13		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
14		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
15		0.00		0.00			0.00	0.00	0.00	0.00	0.000			
							0.00	0.00						
16							0.00	0.00	0.00					
							0.00	0.00						
		TOTAL WIDTH m	MEAN DEPTH m	TOTAL AREA m ²					MEAN VELOCITY m/s	TOTAL DISCHARGE m ³ /s	Carry over to another sheet necessary. Repeat Vertical at top of next sheet.			
		0.00	#DIV/0!	0.00					0.00	0.000				
NOTES												Observer	Date	

ANNEX 5

PROCEDURE FOR MEASURING STREAM FLOW USING A FLOAT

1 Purpose

Discharge (flow rate) measurements in streams are required for planning and design of water resources engineering structures and environmental (hydrological) baseline studies. Measurement of the flow rate in streams in the project area utilizes the velocity-area method. Where a current meter is not available the flow may be estimated using the float method. Floats are used to determine the velocity of flow (V , m s^{-1}). Measurements are also made of the width and depth of the channel to calculate the cross section area of flow (A). Flow (Q , $\text{m}^3 \text{s}^{-1}$) is computed by:

$$Q = V.A \quad (\text{m}^3 \text{s}^{-1}) \quad \text{Equation 1}$$

2 Equipment

The equipment required to estimate flow using the float method includes:

- Surveyors tape (15 m or longer)
- Steel tape measure (3 m or longer) or graduated wading rod
- Float(s)
- Stopwatch
- SOP documentation, field book, and data forms.

3 Safety

Relevant site safety procedures are to be followed, and this task should undergo risk assessment as per mine/company policy. As this method involves entering the stream, this should only be conducted when stream flow rates are low enough to be safe, and the footing is firm. Appropriate footwear should be worn – wellington boots or waders depending on water depth. A second person should be present to raise the alarm/provide assistance in case of an incident.

4 Selection of gauging site

The gauging site should be chosen on the basis of the following criteria:

- The reach should be straight.
- Channel width should be relatively uniform along the reach.
- Channel cross section shape should be relatively uniform along the reach.
- Flow direction should be parallel with the channel sides along the reach, with no eddies or zones of 'dead' water.
- The channel should be clear and unobstructed by trees, aquatic growth or other obstacles.
- Sites subject to backwater effects by downstream obstacles should be avoided.

5 Measurement of geometry of reach

1. Identify the location of two or three cross sections (upstream, middle and downstream) which define the reach.
2. Measure the length of the reach in metres between the upstream and downstream cross sections using a surveyors measuring tape. The length of the reach should be a minimum of 3 metres and may be up to 10-15 metres or longer if channel conditions allow.
3. Measure the stream cross section area at each cross section at the upstream, middle and downstream ends of the reach. The cross section area is measured by measuring and recording the width of the water surface with a measuring tape and multiplying the width by the mean depth. The mean depth is measured by making a number of measurements of the depth at regular intervals across the channel using a steel tape and calculating an average depth.

Enter the geometry data into the field form in the Annex.

6 Measurement of velocity of water

1. Measure the velocity of the water by releasing a float at the upstream cross section and measuring the travel time it takes to arrive at the downstream cross section with a stopwatch. Repeat the measurement several times, releasing the float at different locations spaced at regular intervals across the channel. In each case record the travel time taken by the float to arrive at the downstream cross section with a stopwatch.
2. Calculate an average water velocity by dividing the length of the reach by the average travel time. Note that this figure is an average velocity for the water at the surface at the stream. Velocity decreases with depth to the stream bed. Therefore an average stream velocity should be computed by multiplying the average surface velocity by a velocity coefficient. The velocity coefficient may be assumed to take the value 0.65. Note that the velocity coefficient may be computed by measuring actual average stream velocity with a current meter and dividing this by the surface velocity measured with the float.

Enter the velocity data into the field form in the Annex.

3 Office method / flow computation

The field form at the Annex is also an Excel file. When the field data are entered into the appropriate cells the flow will be computed. The following steps should be followed:

1. Enter the details of the date and location of the flow measurement
2. Enter the channel geometry data and compute an average cross section area for the reach
3. Enter the travel time data and compute an average travel time.
4. An average stream velocity for the reach will be computed automatically by multiplying the average surface velocity by the velocity coefficient.
5. The flow will be computed by multiplying the average cross section area by the average stream velocity.

ANNEX Float gauging field form and excel spreadsheet

ANNEX 6

PROCEDURE FOR OPERATING SEBA DIPPERS FOR CONTINUOUS WATER LEVEL MONITORING

1 INTRODUCTION

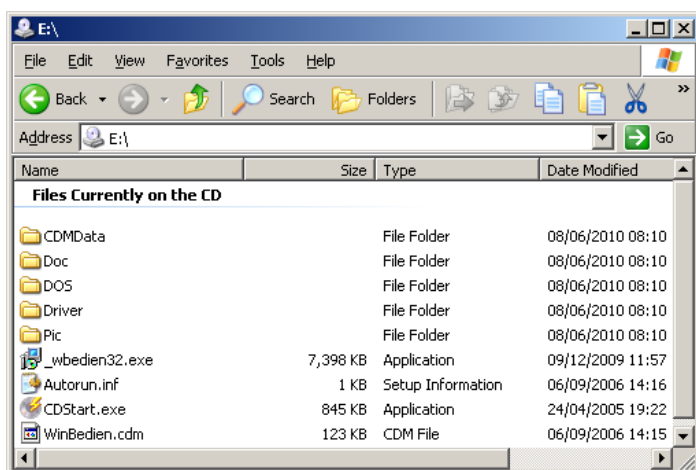
Five SEBA Dipper-3 pressure transducers (range 0-10 metres) have been purchased by the Watershed Monitoring and Evaluation hydrological monitoring programme. The Dippers measure water depth above a pressure sensor. Such instruments are installed in the field at a river gauging station in a stilling well for automatic logging of river water levels. The sensor head includes a self-contained logger in which measurements are stored at intervals chosen by the operator. The stored data are downloaded in the field to a laptop computer.

This document provides instructions for:

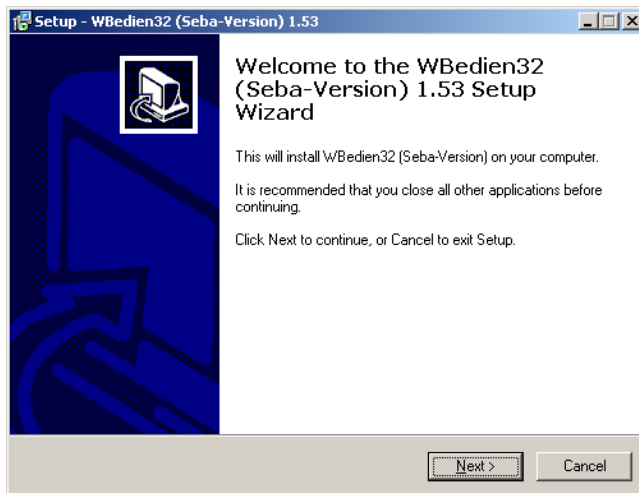
- Installation of SEBA (Dipper-3) software
- Installation of Dipper-3 hardware drivers
- Field installation of Dipper-3
- Operation of the SEBA software and Dipper-3 logger.

2 Installation of SEBA (Dipper-3) software

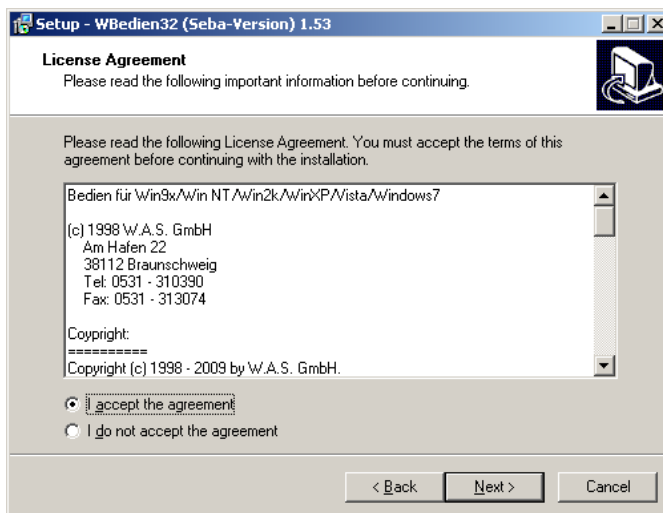
To install Seba software (Win WBedien Standard V1.53) insert the Seba software CD into your CD drive. Navigate to the CD drive in Windows Explorer. The list of files on the CD is shown below.



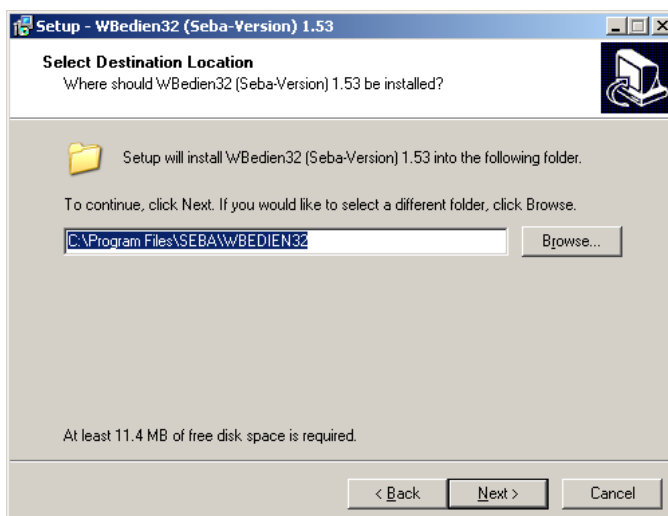
Double click on “_wbedien32.exe” to install the Dipper-3 software. Select English as the language to use during installation. The following screen will appear.



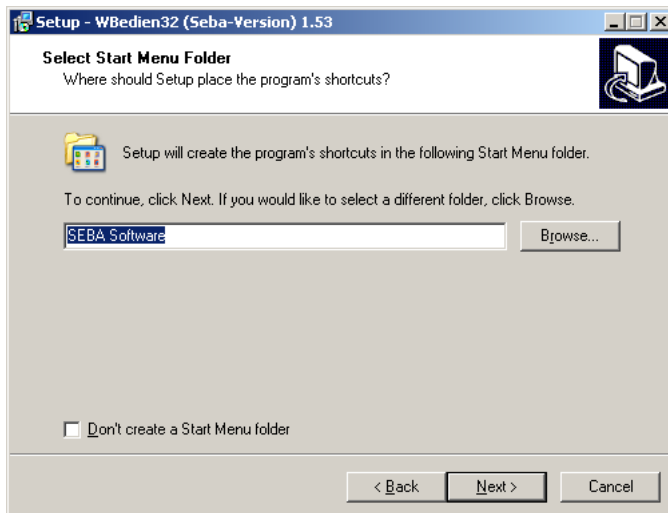
Close all other applications and then click the “Next” button. The following screen appears.



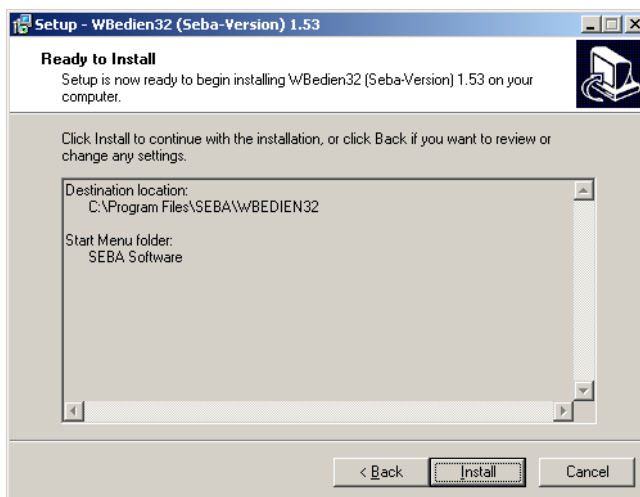
Select “I accept the agreement” and then click the “Next” button. The following screen appears.



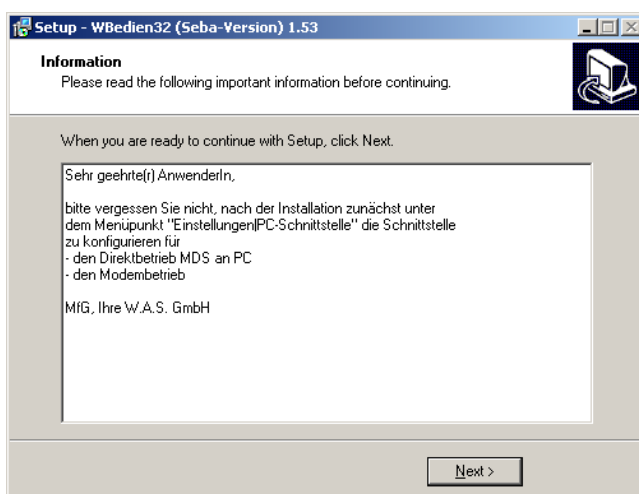
Edit the path according to where on your hard disk you wish to store the software and click the “Next” button. The following screen appears.



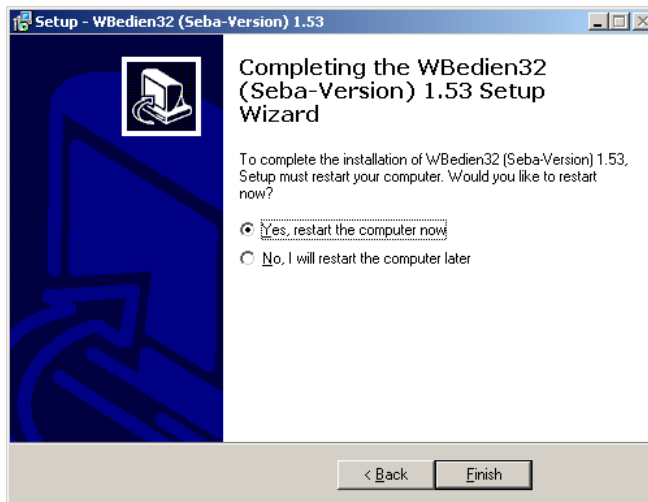
Click the “Next” button. The following screen appears.



Click on the “Install” button. Files will be copied to your hard disk. The following screen appears.



Click the “Next” button. The following screen appears.



Select “Yes, restart computer now” and click on the “Finish” button. Your computer will restart automatically. After re-starting the Seba software will be ready to use.

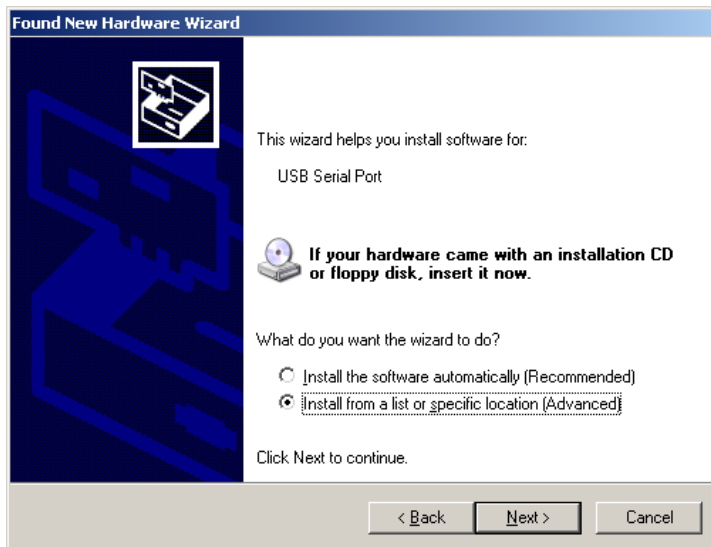
3 Installation of Dipper-3 hardware drivers

The following is the procedure for installation of the hardware driver for the Dipper-3 Interface-Converter USB/RS485 on your computer.

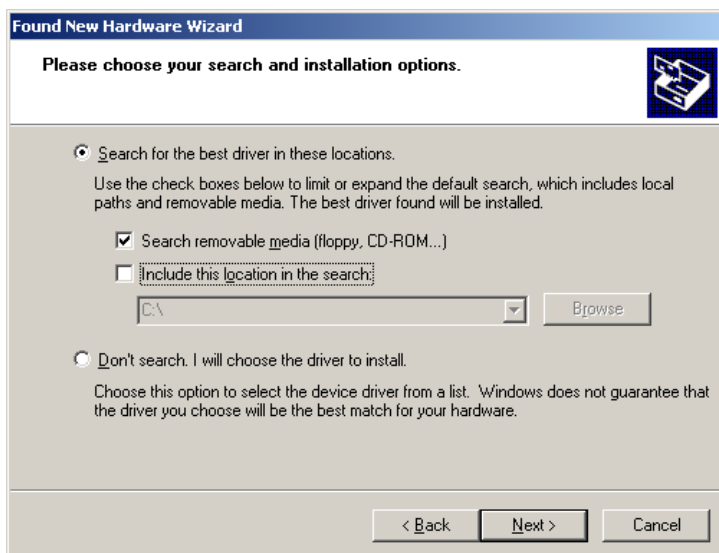
Plug the USB cable in to the USB port on your computer for the first time. Your computer will find the new hardware and software on your computer called “Found New Hardware Wizard will run automatically. The following screen appears.



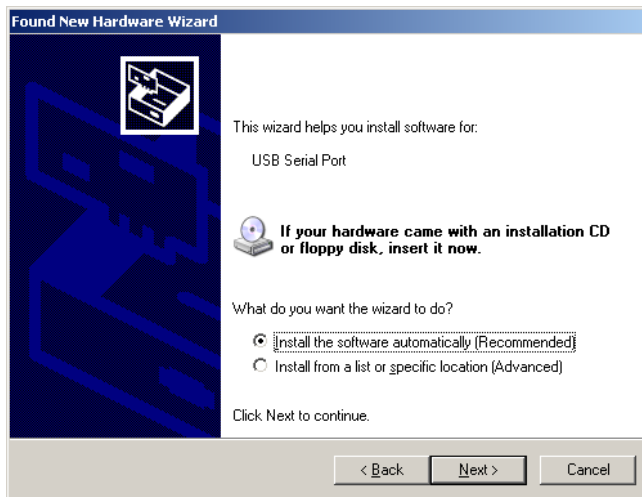
Select “Yes, this time only” and click the “Next” button. The following screen appears



Select “Install for a list or specific location (Advanced)” and click on “Next” button.



Click on “Search removable media (floppy, CD-ROM...)”, insert the SEBA CD labelled “Driver USB to RS485” in your CD drive and click on the Next button. The following screen will appear.



Select “Install the software automatically (recommended)” and click on the “Next” button. The drivers for the Dipper-3 Interface-Converter USB/RS485 will then be installed on your hard drive. The following screen will appear.



Click on the “Finish” button. Installation of the hardware drivers is now complete.

In future your computer will continue to recognise the hardware whenever it is connected. There should be no need to install the drivers again on your computer unless they are accidentally deleted.

4 Field installation of Dipper-3

Get from manual

5 Operation of the SEBA software and Dipper-3 logger

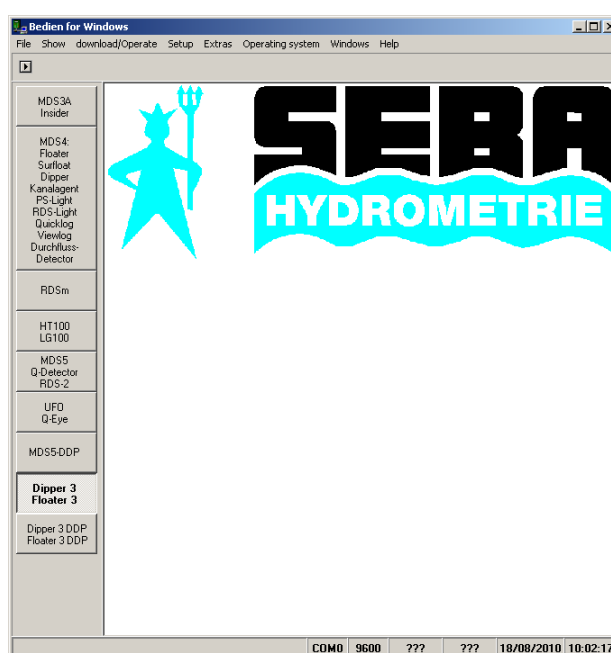
5.1 Setting up communications with the Dipper

The SEBA Dipper manual should be used in conjunction with these instructions.

- Start your computer.
- Before running the SEBA software connect the USB/RS485 interface to the Dipper-3.
- Plug the USB connector into a USB port on your computer.
- The 'Found New Hardware Wizard' will run and the following screen appears.



- Select "No, not this time" and click the "Cancel" button. The wizard will close.
- Run the Wbedien software. The following screen appears.



- Click on “Extras” on the main menu bar. Select “Setup”. Select “Language”. Select “English” and click the “OK” button.
- Click on “Extras, Setup, PC serial port. The following screen appears.

Config serial port for MDS directly

COM-Port: [dropdown] ☐ RS485

Baudrate:

MDS3A/Insider: 9600 [default]

MDS4: 2400 [default]

RDS: 9600 [default]

HT100/LG100: 9600 [default]

MDS5: 9600 [default]

UFO/Q-Eye: 9600 [default]

MDS5-DDP: 9600 [default]

Dipper 3/Floater 3: 9600 [default]

Dipper 3 DDP/Floater 3 DDP: 9600 [default]

aut. increase baudrate: No [dropdown]

☒ repeat block

[?] Help [OK] [Cancel]

- Click on down arrow for COM-Port. Select the COM port that the computer has assigned to the program WBedien. Click on RS485. Ensure that the baud rate for Dipper 3 is “9600”. The screen should look like the following screen. In order to find the right COM port test each COM port by trying each COM port in turn and attempting to connect to the Dipper by selecting *Show, values*. When the correct COM port is chosen the program will connect with the Dipper.

Config serial port for MDS directly

COM-Port: COM23 [dropdown] ☒ RS485

Baudrate:

MDS3A/Insider: 9600 [default]

MDS4: 2400 [default]

RDS: 9600 [default]

HT100/LG100: 9600 [default]

MDS5: 9600 [default]

UFO/Q-Eye: 9600 [default]

MDS5-DDP: 9600 [default]

Dipper 3/Floater 3: 9600 [default]

Dipper 3 DDP/Floater 3 DDP: 9600 [default]

aut. increase baudrate: No [dropdown]

☒ repeat block

[?] Help [OK] [Cancel]

- Click the “OK” button
- Click the “Dipper-3/Floater-3” button to select the Dipper-3 algorithm.
- Click on “Show/Channel setup” to see previously set parameter settings (note you cannot change them under this menu). The following screen will appear.

show channel setup

Chan. state	active	Supply	off
Measuring mode	clock-controlled		
Meas. types	Analog 15bit	normal meas.	
Unit	m		
Cycle	60 min		
a-value	-0.0008171824	switch:	
b-value	14.6537151337	☐ S4	
		☐ S5	
		☐ SW540	
		☐ VSENS2	
Sensor-repro.		0ms	
digit. Offset		0	
Meas. range		0.. 2,304V	
ADW /Gr.-Freq.		Std/1.Flt: 10m	
ADW-timeconstants:			
1. Filter:		10 ms	
2. Filter:		4 ms	
Channel 1 / Channel 2			
Serial no.	C33195	Software version	2.40
No chan.	2	Memory size	1024 kB
		Help	
		Close	

- Note that Water Level is logged at 60 minute intervals on Channel 1 and Battery Voltage is logged at 1440 minute intervals on Channel 2.
- Click the “Close” button to close the screen.

5.2 Setting the Dipper clock

- Click on “Setup/clock”. The following screen will appear.

Setup clock

Serial no.	C33195	PC time
PC	18/08/2010 12:47:24	Set
MDS	18/08/2010 13:47:25	Close

- Click on the “PC time button” then the “Set” button to set the Dipper clock to the laptop time (which should be set on local Ethiopian time).

5.3 Setting up channel settings for the Dipper 3 to log water level and battery

- Click on “Setup/Channel setup”. The following screen will appear.

edit channel setup

Chan. state	active	Supply	off
Measuring mode	clock-controlled		
Meas. types	Analog 15bit	normal meas.	
Unit	m		
Cycle	60 min		
a-value	-0.0008171824	switch:	
b-value	14.6537151337	☐ S4	
		☐ S5	
		☐ SW540	
		☐ VSENS2	
Sensor-repro.		0ms	
digit. Offset		0	
Meas. range		0.. 2,304V	
ADW /Gr.-Freq.		Std/1.Flt: 10m	
ADW-timeconstants:			
1. Filter:		10 ms	
2. Filter:		4 ms	
Channel 1 / Channel 2			
Serial no.	C33195	Software version	2.40
No chan.	2	Memory size	1024 kB
		Set	
		Help	
		Close	

- Here, the water level (Channel 1) logging rate is set at once per 60 minutes. If you wish to change the logging rate enter the desired number of minutes and click on the “Set” button. Click on the “Close” button.
- Note that in order to change the logger settings (system or channel parameters) you need to stop logging before making your changes. After the changes are made you need to start the logging again.

5.4 Entering the current water level (Offset b-value correction)

- To tell the logger what the current water level is and to set this as the datum from which future measurements are made, Click on “Setup / Offset (b-value) correction”.
- Select Channel 1 (the water level channel)
- Click on the “Get value” button.
- Enter the current water level in metres.
- Click on “Enter” to confirm your settings.
- The offset (b-value) correction will be executed.
- To accept the value click the “Set” button.

5.5 Download current values

- Click on “Show / values”. The following screen will appear.

actual values			
Chan. no.	Active	Actual value	Unit
1	☒	-0.18877	m
2	☒	3.6566	V

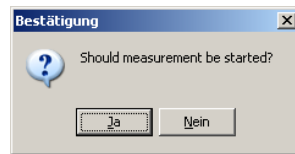
state **measur. off**
Number of active channels **2/2**
Serial no. **C33195**

Measurement stopped: 08/06/2010 10:51:33

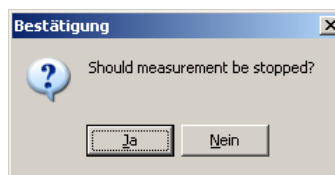
- Click on “ Get c urrent v alue” but on and t he c urrent value of w ater l evel and battery voltage will appear in the screen.
- The voltage should be >3 volts. If the battery voltage is 3 volts the battery should be changed. At 2.7 Volts the Dipper will stop logging. Note the battery can only be changed by returning the Dipper to the manufacturer (Seba) in Germany.

5.6 To start and stop logging

- To start logging click on “Download/operate / Start measurement”. The following screen will appear.



- Click on “Ja” button. Logging will start.
- To stop logging click on “Download/operate / Stop measurement”. The following screen will appear.



- Click on “Ja” button. Logging will stop. Data will not be downloaded.

5.7 Downloading data and restarting the Dipper

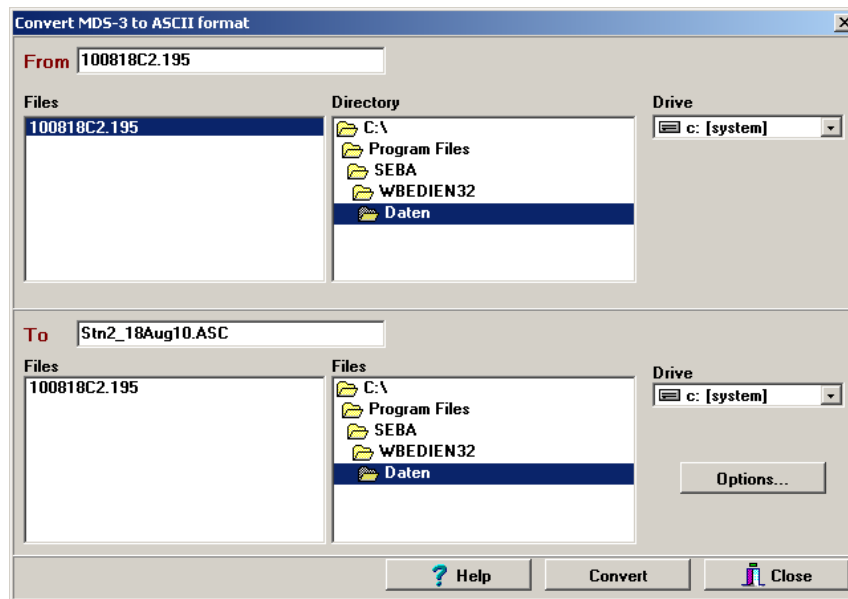
- There are several options for downloading data to choose from, all accessed by selecting “Download / Operate” on the main menu:
 - o Download and restart (Downloads all data up to the last pointer and a new pointer is set. This command should be used most of the time. You will get a new file for each period between two downloads. If you get disconnected while executing the “download and restart” command you have to be careful to use “download old” the next time that you download data from the logger, as the restart command has already been executed by this disconnection.
 - o Download current values (this downloads all data up to the last pointer without setting a new pointer. The measuring process will continue. Next time you download you will download the same data and new data logged in the intervening period.
 - o Download and stop* (this downloads all data up to the last pointer (when you clicked download) and logging stops. (* Only visible if extended functions are shown – menu Extras/setup/program/show extended functions).
 - o Download old (all data recorded between the second last and last start of measurement are downloaded)
 - o Time-selective download (an arbitrary time period can be set and data from a particular channel can be downloaded).
- For the sake of safety in not risking losing data it is recommended to use Time-selective download most of the time, and selecting ALL data. For all choices data

held in Channels 1 and 2 will be downloaded. Channel 1 contains the water level data. Channel 2 contains battery voltage. It is useful to save Channel 2 as well as Channel 1 in order to monitor the battery voltage.

5.8 Conversion of data file (MDS-3 to ASCII)

In order to open downloaded data file and load the data into a spreadsheet the following steps are necessary:

- Click on “File, file converts, data file to ASCII”. The following screen appears.



- Navigate to the folder where you saved the data you downloaded and define the file name to be converted in the “From” field.
- Define the file name you wish the converted data to be written to and the location where you wish the converted file to be saved.
- Click on the “Options” button to define the format of the converted data. The screen should look like the screen below. This specifies a header in the data file, values will be separated by a comma, a point (not a comma) for the decimal, three decimal places, identifier and units. The station number is specified in the comment field.

Options

Header

☒ Write header

☐ Export min/max value

Space left Space(s)

Values

Separator

☐ Tab

☐ Space(s)

☒ Other:

decimal separator

Post-decimal positions

Get identifier ☒

Unit ☒

Comment

Comment

Close

- The above options may be modified in the light of experience and changing requirements for the format of the data file.
- Click on the “Convert” button to execute the conversion.
- Change the .ASC file extension to .CSV and double click the file to open the file in Excel. The heading information is contained all in column A. However the time, date and data values are saved in multiple columns required for HYDATA input. If required, save the file as an Excel file.

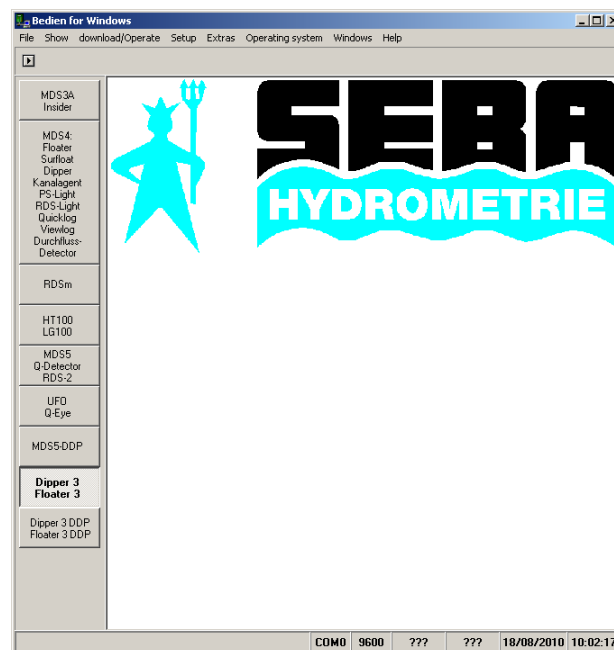
5.9 Typical sequence when visiting a site to download data

- Take the following equipment:
 - o Key to lockable enclosure
 - o Communications (downloading) cable
 - o Laptop + spare battery for laptop
 - o Umbrella (for shade)
 - o Tools for opening bolts that keep the enclosure in place (if necessary to flush out sediment from the stilling well)
 - o Buckets and rope for flushing water down the stilling well.
- Start your computer.
- Before running the SEBA software connect the USB/RS485 interface to the Dipper-3.
- Plug the USB connector into a USB port on your computer.

- If the 'Found New Hardware Wizard' is activated click "No, not this time" as shown on the following screen. Click the "Cancel" button. The wizard will close..



- Run the Wbedien software. The following screen appears.



- Click the "Dipper-3/Floater-3" button to select the Dipper-3 algorithm.
- Click on "Show/Channel setup" to see previously set parameter settings (note you cannot change them under this menu). The following screen will appear.

show channel setup

Chan. state	active	Supply	off
Measuring mode	clock-controlled	Sensor-repro.	0ms
Meas. types	Analog 15bit	digit. Offset	0
Unit	m	Meas. range	0.. 2,304V
Cycle	60 min	ADW /Gr.-Freq.	Std/1.Flt: 10m
a-value	-0.0008171824	ADW-timeconstants:	
b-value	14.6537151337	1. Filter:	10 ms
		2. Filter:	4 ms
	switch:		
	☐ S4		
	☐ S5		
	☐ SW540		
	☐ VSENS2		

Channel 1 / Channel 2

Serial no.	C33195	Software version	2.40
No chan.	2	Memory size	1024 kB

[? Help](#) [Close](#)

- Check logger clock by clicking on “Setup/clock” (Section 5.2). The following screen will appear. If the MDS time is different from the computer clock re-set the MDS clock to equal the logger clock by clicking on the “PC Time” and then “Set” buttons, then “Close”. (Make sure that your computer clock is giving the correct local time. You can adjust this very accurately using a GPS).

Setup clock

Serial no.	C33195	PC time
PC	18/08/2010 12:47:24	Set
MDS	18/08/2010 13:47:25	Close

- Check on current water level and battery values by selecting “Show / values”. The following screen will appear.

actual values

Chan. no.	Active	Actual value	Unit
1	☒	-0.18877	m
2	☒	3.6566	V

state: **measur. off** Number of active channels: 2/2 Serial no.: C33195
Measurement stopped: 08/06/2010 10:51:33

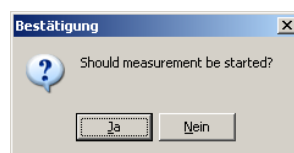
[Get memorised value](#) [Get current value](#)

[? Help](#) [Close](#)

- Click on “Get current value” button and the current value of water level and battery voltage will appear in the screen.
- Check this value with the water level on the staff gauge. The two values should be identical. If not, then the Dipper-3 settings should be adjusted until the two numbers (current value and observed water level) are the same. Refer to Section 5.4 for calibrating the Dipper to the staff gauge.

- Note that in order to change the logger settings (system or channel parameters) you need to stop logging before making your changes. After the changes are made you need to start the logging again.
- Download data that have been logged since the last visit to the site. If you don't want to change the logger settings, select "Download / Operate / Download and Restart". Data will be downloaded and you will be invited to save the data in a folder of your choice.
- If you want to change the logger settings select "Download/Operate, Download and Stop". Data will be downloaded and logging will stop.
- To change logger settings click on "Setup/Channel setup". The following screen will appear.

- Here, the water level (Channel 1) logging rate is set at once per 60 minutes. If you wish to change the logging rate enter the desired number of minutes and click on the "Set" button. Click on the "Close" button.
- Refer to Section 5.4 for calibrating the Dipper to the staff gauge.
- To start logging click on "Download/operate, Start measurement". The following screen will appear.



- Click on "Ja" button. Logging will start.
- Close wBedien for Windows.
- Remove the USB device by clicking on the Safely Remove Hardware icon. Disconnect the USB plug and disconnect the communications cable from the

Dipper-3 cable. **REMEMBER TO PLACE THE WATERPROOF CAP ON THE END OF THE DIPPER-3 COMMUNICATIONS CONNECTOR.**

- Move to the next site and repeat the download process or return to the office and convert the data to ASCII format by following the instructions in Section 5.8.

ANNEX 7

PROCEDURE FOR USE OF CREST STAGE GAUGES TO ESTIMATE PEAK FLOOD FLOWS

1 INTRODUCTION

The WME Hydrological Monitoring Programme has purchased 20 crest stage gauges as part of a larger consignment of hydrological equipment. A crest stage gauge allows the maximum water level attained during a flood to be measured where there is no automatic water level recorder.

The objective of using crest stage gauges on the micro-watershed monitoring programme (MMP) is to provide estimates of stage and discharge for high flows to assist extension of the stage-discharge relationships at the MMP gauging stations. The lower parts of rating curves are established by current metering and float gauging. At high flows, in the absence of cableways for flow gauging, recourse is necessary to an indirect method of flow estimation such as the 'slope-area' method. The use of crest stage gauges enables the slope-area method to be used to estimate high flows. It should be noted that use of crest stage gauges and the slope-area method on the MMP is currently experimental. Since no floods have yet been recorded by the crest stage gauge at Station 11 it remains to be seen if the method provides realistic results. It is intended to install crest stage gauges at all stations where channel conditions are suitable (see below).

This document provides guidance on:

- The crest stage gauge
- The equations used (the discharge equation and the flow resistance equation)
- Choice of site
- Installation of crest stage gauges
- Survey of cross sections
- Sample of bed material
- Operation of crest stage gauges in the field
- Office procedure
- Use of an Excel spreadsheet to calculate flood estimates.

2 CREST STAGE GAUGE

The crest stage gauge that has been purchased consists of a 2-metre long galvanized iron pipe of 2-inch diameter. At each end there is a screw thread and caps are supplied which screw onto each end of the pipe. The lower cap (the base of the crest stage gauge) has several holes drilled in it which allow entry and exit of water as the water level rises and falls during the flood. A single hole in the upper cap (the top of the crest stage gauge) allows the exit and entry of air as the pipe fills with water and empties again.

The pipe contains a removable wood staff.

Ground cork (it should be checked if sawdust can be used as well) is placed in the bowl of the lower cap. As the flood water rises in the pipe the cork floats on the water surface. When the flood water starts to go down some of the cork is deposited on the wood staff marking the position reached by maximum flood water level. This is the 'crest stage'.

Two 'crest stages' (either from two crest stage gauges or one crest stage gauge and one water level recorder) are required on a stretch of river channel, together with the related cross section areas of the flow, mean depth, the distance between the cross sections, the fall in the water surface over the reach and a measure of flow resistance in order to calculate the discharge using a uniform flow equation.

2 EQUATIONS

2.1 Flow equation

The method assumes that depth and velocity of flow are determined by the channel cross section shape, channel slope and bed roughness. In order to allow for non-uniform flow effects caused by change in cross section shape measurements are made at two cross sections. For a reach with two cross sections, and denoting the two sections by subscripts 1, 2 (moving in a downstream direction) then discharge is calculated as:

$$Q = K_2 \sqrt{\frac{\Delta h}{\frac{K_2^2}{K_1^2} L + \frac{K_2^2}{2g A_2^2} \left[1 - \left(\frac{A_2}{A_1} \right)^2 \right] (1 - c)}}$$

Where: Δh = the difference (m) in water surface elevation between sections 1 and 2 (the fall, not the slope)

$L_{1,2}$ = the distance (m) between sections 1 and 2

$c_{1,2}$ = 0 if $A_1 > A_2$ (A = cross section area of flow, m^2)
0.5 if $A_1 < A_2$

g = acceleration due to gravity ($= 9.81 \text{ m s}^{-2}$)

K_1 = conveyance at section 1

K_2 = conveyance at section 2

K is calculated as:

$$K = A (g R)^{1/2} (8/f)^{1/2}$$

Where: R = hydraulic radius (Cross Section area of flow (m^2) / Wetted Perimeter (m)).
Note that R may be substituted by mean depth calculated by Area / Width.

f = the Darcy-Weisbach resistance coefficient (see below).

2.2 Resistance equation

Estimation of the resistance equation is the greatest source of error in the slope-area method. The following equation estimates the flow resistance term above.

$$(8/f)^{1/2} = 5.32 \log (d/D_{84}) + 4$$

Where: d = mean depth (m)

D_{84} = the size of the median axis of the bed material which is bigger than 84% of the material in a sample.

Log = logarithm to the base 10.

The above equation may be in error by 25-30%. However the equation is recommended in the literature and so is used here.

3 CHOICE OF RIVER REACH

The river reach should be:

- Relatively straight and uniform, preferably narrowing slightly in the downstream direction.
- All flood flows should be contained in the channel with no overbank flow.
- Banks should be stable and relatively free of vegetation
- The longitudinal profile should be even with no sharp changes such as waterfalls and pools.
- The length of reach should be around 5 times the width.
- The channel bed may be covered with gravel and boulders. Occasional sand bars may be included.
- The channel bed should be relatively stable and not subject to scour or deposition as this will change the cross section area and lead to greater error in the discharge estimate.

Reaches where water levels are controlled by a downstream cross-section such as a waterfall, a rise in the channel bed or protruding rocks or pools do not produce uniform flow and should be avoided.

The position selected for a crest stage gauge should enable the station manager to remove both the lower cap and upper cap and remove the wood pole with ease and safety.

Where a SEBA Dipper or other water level data logger is installed at a station this may substitute as a crest stage gauge as it will record the maximum water level automatically. Where there is no automatic water level recorder at least two crest stage gauges must be used. The second crest stage gauge should be installed at the gauging station, but this is not obligatory. It is critical that water levels at both crest stage gauges are measured in terms of stage as measured at the gauging station.

3 INSTALLATION OF CREST STAGE GAUGES

Prior to installation a crest stage gauge should have loops welded on its caps to enable a padlock to be fitted (Photo 1). This will prevent caps from being removed. Also, three cross bars of about 0.1 m length should be welded onto the metal pipe.

The crest stage gauge can be mounted on a frame of Dexion iron using U-bolts positioned above and below the cross bars to prevent slippage or removal of the crest stage gauge from the dexion iron frame (Photo 2).

The dexion iron must be concreted into the bed of the river as deeply as possible to minimize the risk of being knocked over by floods. Lengths of dexion iron should be positioned to give support to the main frame (Photos 3 and 4). Crest stage gauges can also be mounted on the upstream and downstream faces of a bridge. Bridges where there is a waterfall immediately below the bridge, however, should be avoided since the assumptions in the hydraulic method will not hold at such sites (see above).

The base of the crest stage should be positioned above the bed of the river channel at a height (water depth) where current metering by wading becomes impractical. In this way the crest stage gauge can monitor floods that are not measurable by current metering.

A maximum water level is required both at the crest stage gauge and at the gauging station. Where there is a Dipper data logger installed at a station the maximum water level should be obtained from the logged data record, taking due note of the date and time of the station manager's observation of the flood mark (ie the flood peak should be sought on the day before – or maybe a few days before – the observer's observation).

Note that if a datalogger (Dipper) is not installed at a station then two crest stage gauges will be required. One of the crest stage gauges does not necessarily have to be installed at the gauging station, but it is convenient if it is installed at the station. The second gauge may be upstream or downstream of the station. It is critical that both gauges are surveyed in relative to the staff gauge at the station (see below). The crest stage gauge at the station is operated in the same way as the upstream (or downstream) crest stage gauge.

Photo 1 Metal loops are welded on the end caps of the crest stage gauge so that a padlock can be fitted



Photo 2 The crest stage gauge is attached to the dexion iron frame using three U-bolts



Photo 3 The crest stage gauge is supported in order to minimise damage by floods



Photo 4 The crest stage gauge completed



4 SURVEY OF CROSS SECTIONS

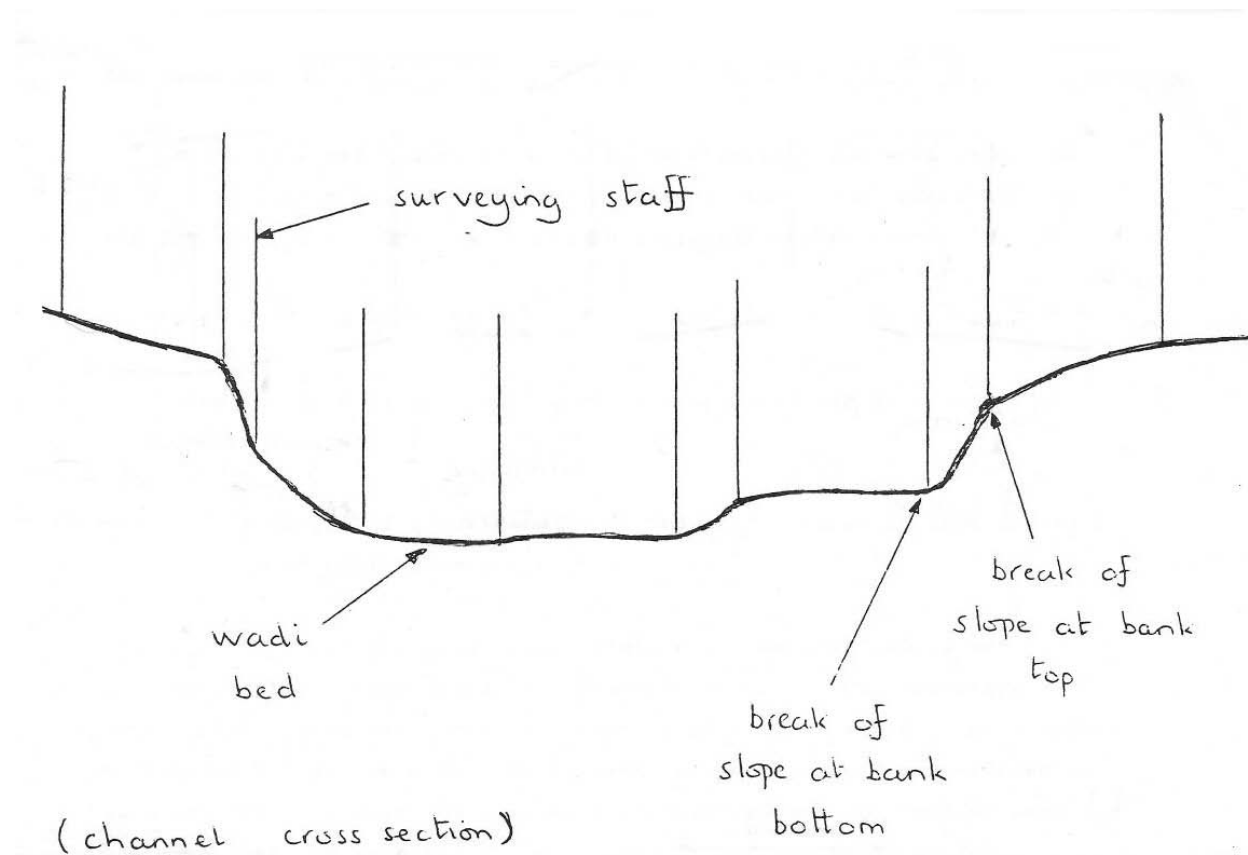
Once the crest stage gauge(s) are installed the cross sections at which the crest stage gauges are installed should be surveyed by an experienced surveyor. The following needs to be surveyed:

- The upstream cross section (Section 1)
- The downstream cross section (Section 2).
- The distance between the sections.

The bench mark used for these surveys should be the top of the first staff gauge at the main gauging station which is at 1.00 m water level. It is useful if a second benchmark is also established. The second benchmark chosen should be an immovable object that is not going to be swept away by a flood. The second benchmark should be marked with paint.

At each cross section a tape should be placed across the channel with its zero on the top of the left bank (looking downstream). The survey should commence at the top of the left bank at the zero on the tape. The survey staff need only be placed at the major breaks of slope across the channel and should continue to the top of each bank (Figure 1). There is no need to survey the current water level.

Figure 1 Illustration of the positioning of the survey staff at breaks of slope when surveying a channel cross section



The output of the survey should be a set of pairs of values of:

- Distance from tape zero on the left bank
- Elevation of the ground at major breaks of slope in terms of stage (water level) on the staff gauge at the gauging station.

It is necessary to survey the cross sections once only per year unless the cross sections are unstable. The survey could be repeated at the end of the wet season to see if any change has occurred.

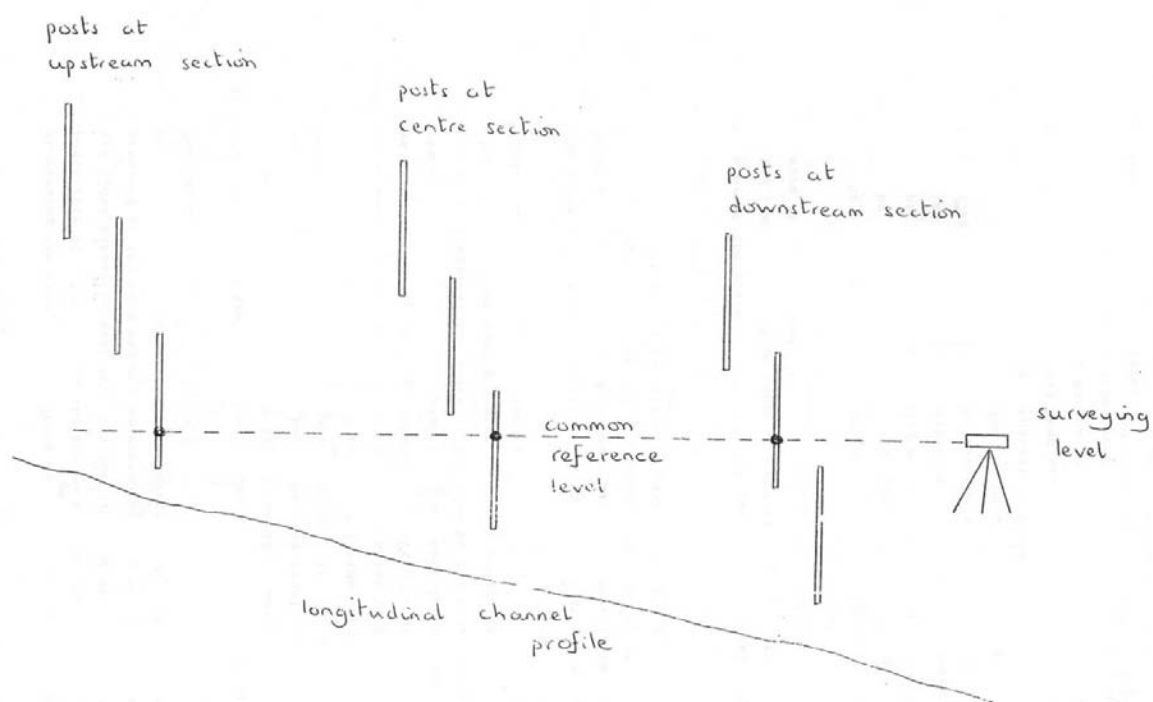
Measure and record the distance between the cross sections with the tape.

Once the survey is complete the final task is to transfer the staff gauge scale onto the crest stage gauge(s) and their wood staffs. To do this, position the tripod so that you can sight onto both the staff gauge at the gauging station and the crest stage gauge(s) (Figure 2). Without using the survey staff sight first onto the staff gauge and note the stage. Then swivel the survey level and sight onto the crest stage gauges. Mark the crest stage gauge(s) with the stage recorded from the staff gauge with a marker pen. This might be, for example, 2.42 m. Then, using this as a starting point, mark with the pen a complete scale at 0.1 m intervals (ie 2.40, 2.50, 2.60, etc) on the crest stage gauge and label the marks with the pen (Photo 5). This resulting scale will mirror the staff gauge at the gauging station. Alternatively, a staff gauge could be attached on the dexion iron with the 2.42 m on the staff scale at the level of the mark made by sighting from the staff gauge at the gauging station. This will transfer the stage scale on the staff gauge at the gauging station onto the crest stage gauge. Maximum flood levels at the crest stage gauge will therefore be read in terms of stage at the gauging station.

A stage scale is also marked on the wood staff at 0.1 m intervals. It is important to work out the stage at the base of the wood staff. Make sure the bottom cap is in place (the wood staff rests on this). First, transfer the highest stage level marked on the outside of the crest stage gauge on the wooden staff. If the wood staff sticks up above the top of the metal pipe it is necessary to measure the distance from the top of the wood staff to the top-most level mark on the metal pipe. Then measure this same distance downwards from the top of the wood staff and mark the top-most level on the wood staff with the pen. Starting at this level (say it is 3.20 m) use a tape measure to mark a scale on the wood staff at 0.1 m intervals and label the marks with the correct stage levels. All flood water levels can now be read directly from the wood staff by the station manager. A tape measure should be used to measure centimeters between the 0.1 m marks.

This completes the surveying in of the crest stage gauge.

Figure 2 Surveying the common stage scale on staff gauges and crest stage gauges



Note 1: "Post" = staff gauge or crest stage gauge

Note 2: The common stage scale ensures that the water levels measured at each section are directly comparable with each other.

Photo 5 Marking the stage scale on the crest stage gauge



5 SAMPLE OF BED MATERIAL

The bed material needs to be sampled only once, usually the time of installation of the crest stage gauge. The sampling technique should be carried out as follows:

- A sample of 100 elements is required, collected from the full width of the channel up the banks to the level reached by floods and along the full length of the channel between the crest stage gauges (Figure 3).
- To cover the area in a representative way sampling should be carried out by walking across the channel several times measuring approximately the same number of elements on each crossing. For example if 10 crossings are made about 10 elements should be measured. Ensure that the successive crossings are made upstream of each other so that the bed material to be sampled is undisturbed.
- During each crossing an element should be picked up every pace or so. The sampler must not look at what is to be picked up and the first element to be touched with his/her fingers should be picked up and measured.
- Measure the median axis with a ruler (Figure 4). Note the values on the bed sediment sampling sheet. There are 100 boxes on each sheet.

Figure 3 Example of sampling pattern

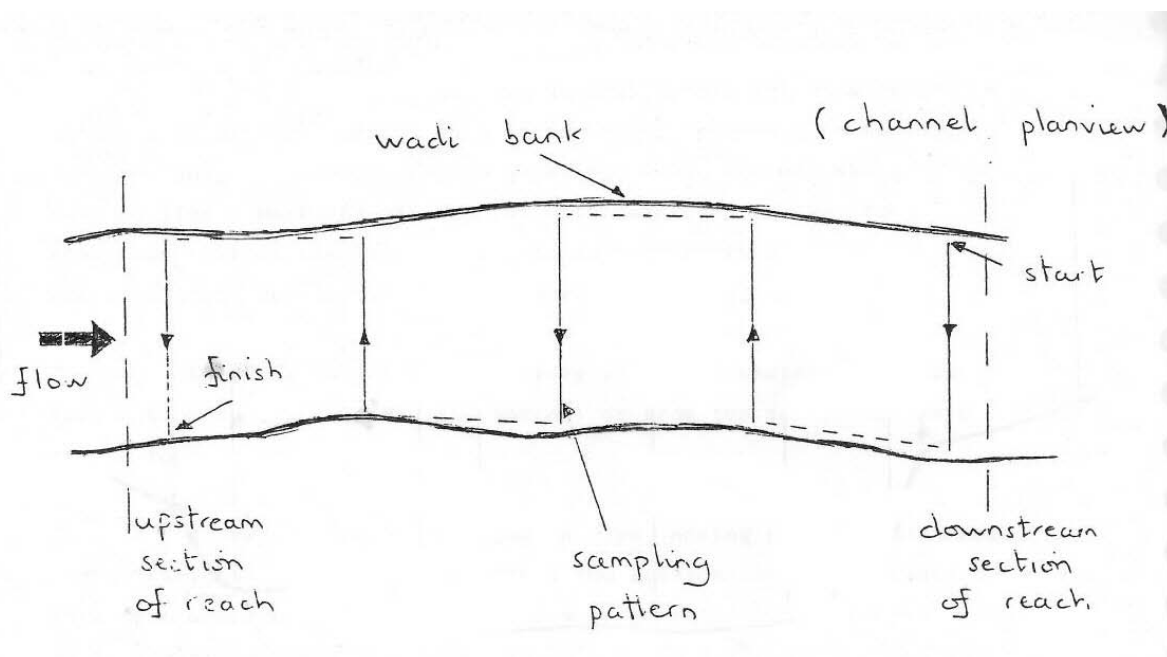
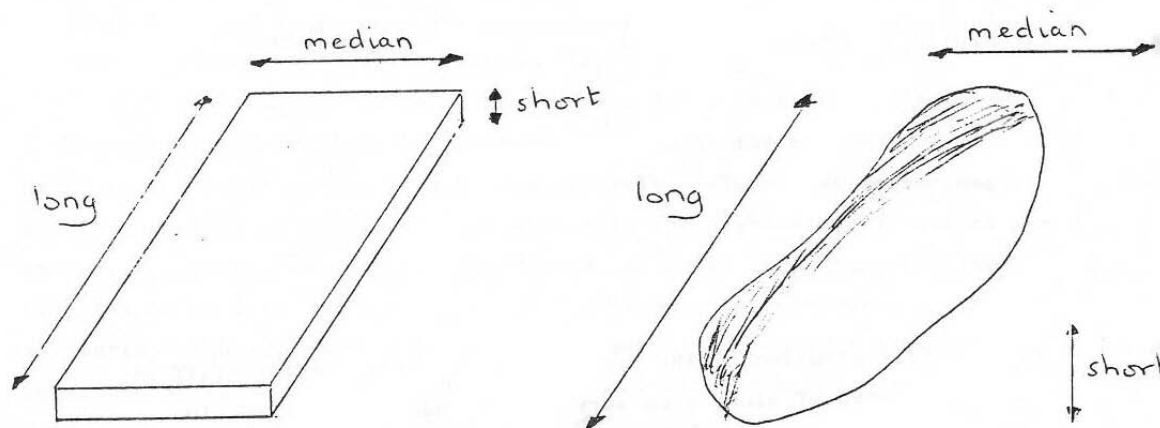


Figure 4 Definition diagram for the median axis of a bed material element



6 OPERATION OF CREST STAGE GAUGES IN THE FIELD

The station manager should take the following with him/her each time he/she visits the crest stage gauge:

- Padlock keys (two padlocks).
- Crest Stage Gauge Data Recording Sheet (see Annex).
- Cork powder in a watertight container.
- Grease in a small container.

The following is the sequence of actions to be carried out each day by the station manager.

1. In the morning or after a flood has occurred go to the crest stage gauge.
2. Remove the top cap and lift out the wood staff.
3. Inspect the wood staff and identify the maximum level reached by the flood. This should be indicated by the highest point on the staff reached by the cork or sawdust.
4. Read off the maximum stage directly from the wood staff, using a tape measure to measure the water level to the nearest centimeter.
5. Record the maximum water level on the data sheet against the date that you made the measurement. Note also the time of day that you performed this task.
6. Also record any observations or information about the flood that occurred last night – for example the time it occurred, and any other observations.
7. Now remove the bottom cap and inspect the inside of the cap to see if there is sufficient cork in it for the next flood. If necessary clean sediment out of the cap and put some more cork in the bottom of the cap.
8. Put a little grease on the screw threads on the outside at the top and bottom of the crest stage gauge pipe.

9. Replace the bottom cap taking care not to spill any cork or sawdust. Screw the cap on as fully as possible.
10. Clean the wood staff of cork or sawdust and mud.
11. Replace the wood staff in the crest stage gauge.
12. Replace the top cap. Screw the cap on as fully as possible.
13. Replace and lock both padlocks.

If there was no rain the previous night it is not necessary to carry out the procedure. However it is necessary to inspect the crest stage gauge each morning to check for any damage.

Continue measurements each day until the end of the month when the data recording sheet will be full. Staff of the Bureau of Water Resources Development will collect the form at the end of the month.

7 OFFICE PROCEDURE

Introduction

Create a file for each gauging station in which all data sheets (survey data sheets, bed sediment data sheets and crest stage gauge recording sheets) can be kept.

Survey data

Process the survey data to obtain a table with two columns:

- Distance on tape (m)
- Elevation (m) – note this should be in terms of stage at the gauging station.

Draw cross sections 1 and 2 on graph paper using the same scale (say 2 cm to 1 metre) for the horizontal axis (distance on tape) and the vertical axis (elevation / stage). Make a table on a sheet of paper with three columns:

- Stage (m)
- Cross section area (m²)
- Width (m).

For stages of 0.5m, 1.0m, 1.5m, 2.0m, 2.5m, 3.0m, 3.5m etc count the number of squares below each stage on the graph paper and convert to units of area. For each stage measure the width of the water surface using a ruler. Populate the table with the data obtained. Draw graphs of Stage (X-axis) against Cross Section Area (Y-axis) and of Stage (X-axis) against Water surface width (Y-axis). This can be done in Excel (see below).

Bed sediment data

For each station type the 100 measurements of bed sediment median axis into a single column in Excel (see below). Sort the data into ascending order (smallest to largest) (In Excel: *Data, Sort, Ascending, Smallest to Largest*). For each sediment value calculate the cumulative percentile (if there are 100 values this is simply a list of numbers from 1 to 100 starting at 1 adjacent to the smallest value and 100 against the largest value. Look for the 84th percentile and read the value of D₈₄ directly from the spreadsheet. Note that the units of D₈₄ are metres, so divide the value in mm by 1000.

Crest stage data

These data will be recorded on paper sheets by the station managers and, if installed, by Dippers. Obtain all crest stage data for each station from the various sources and, for each station, make a table with the following columns:

- Date of flood
- Date of observation of crest stage
- Crest stage (m) at Section 1
- Crest stage (m) at Section 2.

8 USE OF AN EXCEL SPREADSHEET TO CALCULATE FLOOD ESTIMATES

An Excel Workbook ("Flood Flow Estimation Workbook.xlsx") has been programmed for the calculation of peak flood flows. Make a copy of the Workbook for each station. The Workbook contains the following five Worksheets:

1. Peak flood calculation - the main flow calculations are made in this worksheet.
2. Area, Width and Sediment Data – enter the cross section area, width and sediment data.
3. Stage-Area relationships – this is a graph of the relationship between stage (m) and cross section area (m²) at sections 1 and 2.
4. Stage-Width relationships – this is a graph of the relationship between stage (m) and water surface width (m) at sections 1 and 2.
5. Bed material size distribution – this is a graph of the cumulative percentage of samples less than or equal to a given size.

Enter the cross section survey data (Stage, Area and Width) (see Section 7) into Worksheet 2 and update the graphs of stage against area and width in Worksheets 3 and 4.

Enter the bed sediment data into Worksheet 2, sort the data and find D_{84} . Update the size distribution graph in Worksheet 5.

The following steps may now be taken to calculate a peak flood flow in Worksheet 1:

1. Enter the date of the flood in column A.
2. Enter the maximum water level at Section 1 in column B.
3. Obtain the cross section area relating to the maximum water level for Section 1 by reading from the graph for Section 1 in Worksheet 3.
4. Enter the cross section area relating to the maximum water level for Section 1 in column C.
5. Obtain the width relating to the maximum water level for Section 1 by reading from the graph for Section 1 in Worksheet 4.
6. Enter the width relating to the maximum water level for Section 1 in column D.
7. Repeat steps 3 to 6 for Section 2 and enter the respective values into columns H (stage), J (area), and K (width).
8. Make sure the length of the reach is correctly specified in cell G11.
9. The calculations will be done automatically in the columns highlighted in yellow.

10. The peak flood flow will be calculated in Column P. Review the peak flood flow for realism. If unrealistic or not calculated check input data (stage, area, width values for each section).

Note that columns H (maximum stage at the gauging station) and P the peak flood flow are highlighted in red. Transfer pairs of values in these columns to HYDATA for the extension of the rating curve for the respective station.

ANNEX 8

PROCEDURE FOR USE OF THE DH-48 SUSPENDED SEDIMENT SAMPLER

1 INTRODUCTION

The objective of suspended sediment sampling is to determine the instantaneous mean discharge-weighted suspended sediment concentration at a cross section. This is done by collecting a mean discharge-weighted suspended sediment sample. The DH-48 is a depth-integrating suspended sediment sampler. The DH-48 can be used to obtain a mean discharge-weighted suspended sediment sample. The suspended sediment concentration can be combined with the discharge to compute the measured suspended sediment discharge.

2 CHOICE OF CROSS SECTION

Choose a cross section as close as possible to the gauging station that is as rectangular as possible, where the depth of water is as uniform as possible across the section, and flow is moving in downstream direction parallel to the riverbanks. Sediment sampling is often carried out at cross sections where current meter measurements are made. Avoid (for both types of measurement):

- Sites where there is active bank erosion.
- Sites where there are backwater effects from, for example, a downstream obstruction such as a tree or rock bar.
- Sites downstream of tributaries, unless you are trying to include the tributary inflow.
- Bridges with piers, because of extra turbulence and potentially higher suspended sediment concentrations.

Note that suspended sediment is not like flow where the flow through any cross section is the same. Some sediment may be deposited and some entrained between sections.

Once you have chosen a cross section take all future samples at that cross section.

Take pictures and field notes to document the cross section.

3 THE DH-48 SAMPLER

The sampler comprises the following equipment:

- Sampler body
- Wading rods
- Pint bottle
- Yellow nozzle of diameter 0.25 inch.

When on the river bed the sampler nozzle is 3.5 inches (about 88 mm) above the river bed. There is therefore a 3.5 inch zone above the bed which is not sampled.

Check the nozzle regularly for blockage. If the bottle doesn't fill during sampling the nozzle may be blocked. Blow into the nozzle to clear any obstruction. There should be an airtight seal between the sample container and the sampler body. Holding your finger over the air exhaust try to blow into the nozzle. There should be no escape of air.

4 SAMPLING METHOD

The instantaneous mean discharge-weighted suspended sediment concentration at a cross section is obtained by taking depth-integrated suspended samples at intervals across the river channel.

A single sample is taken at each of a number of verticals. The verticals are positioned mid-way between verticals used for current meter gauging. The number of verticals where samples are taken should be sufficient to define the mean discharge-weighted concentration at the cross-section at the time of sampling.

“Manual bottle” samples

In shallow flows (0.3m and less) it is sufficient to take a sample in an ordinary bottle. Submerge the open-mouthed bottle into the water by hand. Point the bottle upstream and hold the bottle at a 45° angle to the stream bed. Fill the bottle by moving it from the surface to the bed and back to the surface. Maintain an un-sampled zone of about 3 inches above the river bed so that the results are compatible with DH-48 results. Such “manual bottle” samples are not depth-integrated samples.

Depth-integrated samples

Depth-integrated samples may be collected using the following method:

- Insert a clean bottle into the sampler
- Wade into the stream, at the desired vertical (see below).
- Stand sideways to maximize stability and minimize disturbance of the flow. In strong flows bend the upstream knee slightly and lean into the flow to improve stability.
- Hold the wading rod as far as possible away from your body and face the sampler directly upstream.
- Keep the wading rod at a 90o degree angle to the water surface. Do not tilt the rod (see photos 1-4 below).
- Lower the sampler to the water surface, with the tail in the water, and the nozzle above the water surface.
- Traverse the full depth and return the sampler to the surface at a constant transit rate.
- When the bottom of the sampler touches the river bed immediately reverse the sampler direction.
- The transit rate in raising the sampler need not be the same rate used in lowering the sampler, but both rates must be constant to obtain a velocity- or discharge-weighted sample.
- The bottle should be full to approx. 3 inches below the top (=350-420 ml, average 395 ml).
- The verticals chosen for sampling should be mid-way between the verticals defining a sub-section used in current meter flow gauging (Figure 1). Thus the sample is assumed to be representative of the sub-section in which it is taken.

Photo 1 Technique for holding wading rod vertical (1)



Photo 2 Technique for holding wading rod vertical (2)



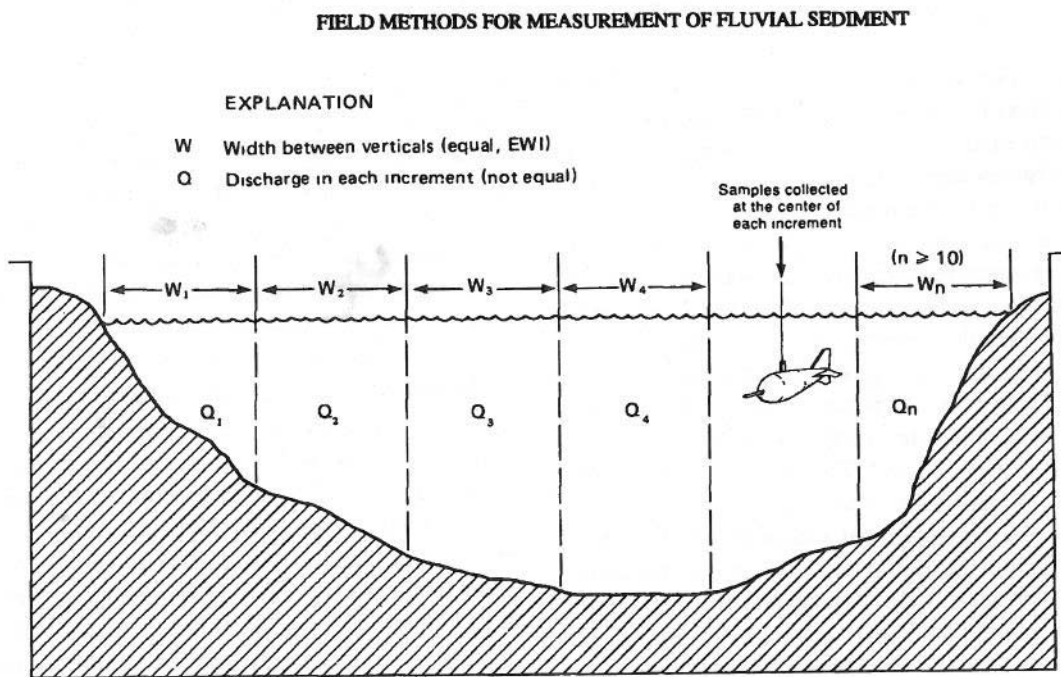
Photo 3 Technique for holding wading rod vertical (3)



Photo 4 Technique for holding wading rod vertical (4)



Figure 1 Position of depth-integrated samples



- The sub-section carrying the greatest flow should be sampled first. The sample bottle should be filled at this sampling vertical.

Table 1 can be used to estimate the transit times to collect a sample of 395 ml.

Table 1 Filling times for the DH-48 sampler

Velocity (m/s)	Volume (ml)	Time to fill (seconds)
0.30	395	41
0.36	395	34
0.42	395	29
0.48	395	26
0.54	395	23
0.61	395	20
0.67	395	19
0.73	395	17
0.79	395	16
0.85	395	15
0.91	395	14
0.97	395	13
1.00	395	12
1.09	395	11
1.21	395	10
1.45	395	9
1.58	395	8
1.76	395	7
2.06	395	6
2.30	395	5
2.73	395	4

The transit rate (rate for traversing the depth of water twice) can be calculated by dividing two times the Depth by the Time to Fill.

Thus if $V = 0.3$ m/s, the transit time T is 41 seconds.

If the stream depth is 0.5 metres, the transit rate is $(2 \times 0.5) / 41 = 0.02$ m/s.

In practice it is difficult to be sure you are traversing the flow depth at the correct rate. The important thing is that at the end of the traverse the bottle should not be over-full (and discharging) or under full.

- Other sub-sections should then be sampled. It is important to use the same transit rate as was used in the first sub-section. So, in subsequent samples (where the depth is shallower and the discharge is lower) the bottle will not be filled and a smaller sample will be collected. This is how a “discharge-weighted sample” is obtained. This technique is called the “Equal Width Increment” (EWI) method.
- The samples should be aggregated into one sample container, labelled and sent to the laboratory for analysis.

- Samples should be labelled as follows:
 - o Site
 - o Date
 - o Time
 - o Sub-section number
 - o Bottle [number] of [Total no. of bottles]
 - o Staff gauge height
 - o Initials of sampler.

ANNEX 3 REVIEW OF SUB-WATERSHED OUTLETS

REVIEW OF SUB-WATERSHED OUTLETS

1 INTRODUCTION

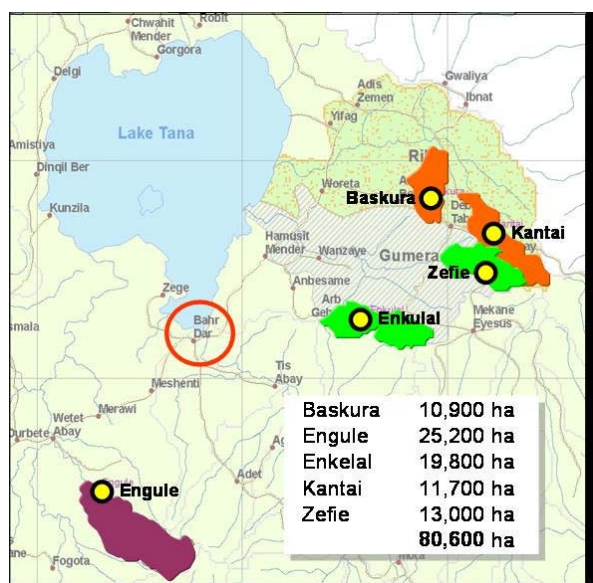
In the period between the first and second inputs of the short term consultant hydrologist project stakeholders have re-affirmed their intention to establish hydrological and sediment monitoring stations at the sub-watershed outlets.

The primary objective of the stations at the outlets is to monitor water and sediment discharging from the TBIWRDP B1 component project areas for the purpose of assessment of the impact of watershed management interventions.

This review re-assesses the feasibility of establishing monitoring stations at the outlets of the Enkulal, Baskura, Zefie, Kentay and Jema sub-watersheds (Figure 1). Its purpose is to assist the RPCU and NPCU in making an investment decision on the construction of the river gauging stations at the sub-watershed outlets.

The Ministry of Water Resources will be responsible for the operation and maintenance of the stations once they are constructed.

Figure 1 Project sub-watersheds



Source: Halcrow Group Ltd (2007).

2 Technical review

Investigations during and after the consultant hydrologist's first input by NIRAS (NIRAS, February 2010) found that (i) the locations of the outlets are relatively inaccessible, and (ii) owing to the size of the channels at the outlets bank operated cableways (BOCs) will have to be established in order to enable gauging of high flows.

Access tracks

Access tracks to the sites are a pre-requisite for construction of the BOCs. A local consultant was hired by the WME programme to assess the feasibility and cost of constructing access tracks to the outlets. The results of the access tracks feasibility study are given in Table 1, including number of beneficiaries (the roads were routed to maximise access to markets).

Table 1 Results of access road feasibility study

Outlet	Kebeles along the route	Nr of beneficiaries	Length of road (metres)	Cost estimate Birr (excluding tax, overhead and price increases, allow 20-30% additional)
Baskura			3,560	840,939
Jema	Lehulum salam, Birhan Chorra, Zemene Birhan, Tekle Terara, Abro Menor, Gosh Meda, Teru Meda and Anoraita.	58,482	6,775	3,836,257
Enkulal		590	4,249	2,407,427
Kentay	Wewa and adjacent kebeles	5,517	8,074	2,353,115
Zefie	Gena Mechawcha and adjacent Kebeles	5,581	1,590	1,114,377
Total		79,179	24,25 km	Birr 13,928,795 (including overhead and price increase)

Bank operated cableways

Bank operated cableways (BOC) comprises the following basic elements:

1. Upright steel winch posts on each bank (2-inch diameter steel pole where the span (the distance between winch posts) is up to 50m. Where the span exceeds 50 m universal column (I-section) building steel stanchion IPB 305 mm is required).
2. Track cable with turnbuckle (length = 1.15 x span).
3. Tow cable (length = 2 x 1.15 x span) with pulley and pulley block.
4. Portable mechanical double winch with counter.
5. Portable crane trolley.
6. Co-axial suspension cable for signal transmission (1.4 x span).
7. Current meter.
8. Suspended sediment sampler.
9. Sinker weight.
10. Accessories and tools.

Of the above items 1, 2 and 3 are fixed in place and items 4-10 may be demountable on completion of a gauging and taken and erected at another site.

Note that whether 2-inch diameter steel poles, which are available in the local market, can be used determines whether the cableway can be termed a 'local' BOC, or not.

Local experience has demonstrated that 2-inch diameter steel poles can be used where the span of the cableway is up to 50m. Local experience has also demonstrated that a 'local' BOC can only be used to gauged flows where the velocity of the water is up to 2 m/s, requiring a 75 lb sinker weight. For spans over 50m and velocities over 2m/s a heavier sinker weight is required and 2-inch steel poles do not give sufficient structural support for the cableway. Universal column (I-section) building steel stanchions (IPB 305 mm) are required instead. Table 2 lists the approximate dimensions of the five sites, whether use of 2-inch steel poles is feasible (based here only on the span of the cableway – the velocity of the water at high flows has not been estimated) and the length of cable required.

Table 2 Pre-feasibility level design of sub-watershed stations for purpose of budgeting

Sub-watershed	A Approx. span (m)	B Approx. depth to riverbed (m)	C Type of winch posts	D Track cable length (m)	E Tow cable length (m)	F Suspension cable length A+B (m)
Baskura	60	20	I-section	60	120	75
Enkulal	60	15	I-section	60	120	75
Jema	50	8	Steel pole	50	100	60
Kentay	25	10	Steel pole	25	50	35
Zefie	80	15*	I-section	80	160	95

* Not visited by NIRAS

3 Assessment and prioritisation

The technical review of the sub-watershed outlets has also taken account of the following factors:

- Length of access road and estimated cost of construction.
- Number of beneficiaries having increased access to market as a result of the road construction.
- Feasibility of a local BOC vs I-section steel stanchion.
- Whether there is a dam or proposed dam situated downstream that might benefit from the data collected at the station.
- Whether installation of a river gauging station is being considered by another project.
- Exceptional difficulties assuming the access road is constructed (in the opinion of the consultant hydrologist).
- Overall feasibility of construction.

Table 3 summarises the key points of the technical review for each of the outlets and provides a prioritisation of the order of construction.

Table 3 Prioritisation of sub-watershed outlets

Criterion	Enkulal	Baskura	Zefie	Kentay	Jema
1. Length of access road	3 km	16 km from Debre Tabor	16 km from Debre Tabor	5.5 km	2 km
2. Cost of road construction (from Table 1), including allowance for overhead and price increase.	3.18 M Birr US\$ 227,000	1.11 M Birr US\$ 79,000	1.47 M Birr US\$ 105,000	3.11 M Birr US\$ 222,000	5.06 M Birr US\$ 361,000
3 Number of beneficiaries from road construction (from Table 1)	590	n/a	5,581	5,517	58,482
4 Feasibility of 'local' Bank Operated Cableway (from Table 2)	No	No	No	Yes	Yes
5 Dam downstream ?	No	Ribb	Gumera	Ribb	No
6 Is site being considered by another project ?	No	NIDP (but not prioritised)	A1 component ("Upper Gumera near Debre Tabor")	Ghent University	No
7 Exceptional difficulties assuming access road is constructed	None	None	None	None	Channel at gauging site is unstable.
8 Assessment	Site is relatively accessible and cost of access road is medium.	Cost of access road is lowest.	A1 component has Zefie within its programme. WME programme need not implement Zefie.	Ghent University intends to implement Kentay. WME programme need not implement Kentay.	Jema sub-watershed is different from the others (contains bigger proportion of floodplain).
9 WME prioritisation	2	1			3
10 Residual comments				In order to better monitor inflows to Ribb reservoir the station should be located further downstream.	Site is located downstream of Jema dam site, so will provide no useful information for dam. Channel at gauging site is unstable.

It is concluded that stations at Zefie and Kentay should be implemented by other programmes (Kentay – by Ghent University, Belgium, and Zefie - by the A1 component of TBIWRDP). This will save WME programme funds.

The following outlets should be constructed by the WME programme in the following order of priority, subject to the availability of funds:

1. Baskura – reason: cost of access track is lowest, the site is relatively accessible and the Ribb dam is situated downstream for which the station would contribute information.
2. Enkulal – reason: the cost of the access track is medium.
3. Jema – reason: the cost of the access track is the highest of all outlets. This sub-watershed is different from the others (contains bigger proportion of floodplain) and for this reason should be constructed. It should be noted, however, that the river channel at the (alluvial) gauging site is unstable, potentially leading to data quality issues.

Section 4 sets out the cost of the Baskura, Enkulal and Jema stations.

4 Monitoring equipment

The following monitoring is proposed at each sub-watershed outlet:

- Automated measurement and recording of water level by pressure transducer. It is considered that a locally sourced stilling well will be required in order to provide maximum protection to the pressure transducer from flood waters, although alternative means of installation of pressure transducers will be investigated.
- Automated measurement and recording of turbidity by means of a turbidity sensor connected to a battery operated data logger. Means of installation of the turbidity sensor will be investigated so as to provide representative data and yet protect the sensor from flood damage.
- Stage-discharge measurements will be performed by wading at low stages and cableway measurements at high stages.
- The cableways will be demountable and portable as far as possible.
- One current meter and sinker weight will be purchased, to be used at all stations.
- Suspended sediment sampling will be carried out using the US D-74 procured in Lot 1, or the D-96 in the Bahar Dar Hydrology Office. A suspended sediment sampler is not included in the bill of quantities (see below).

Support and training during the cableway installation process will be provided by the cableway manufacturer. This is necessary to ensure efficient installation and transfer of skills in equipment operation and maintenance.

The Ministry of Water Resources will be responsible for operation and maintenance of the stations once constructed and installed.

5 Bill of quantities

Table 4 lists a bill of quantities for the Baskura, Enkulal and Jema stations.

Table 4 Sub-watershed outlet stations – bill of quantities

Priority	1	2	3
Outlet	Baskura	Enkulal	Jema
Item			
1. Access track, km	16	3	2
2. Water monitoring equipment (fixed installation)			
Staff gauges, D50	10	10	5
Pressure transducer	1	1	1
Turbidity monitoring sensor	1	1	1
Cable for turbidity sensor, metres	40	40	40
Data logger for turbidity sensor	1	1	1
Enclosure, weatherproof to IP67, for data logger and battery	1	1	1
Enclosure, GRP, IP54 sealing, lockable	1	1	1
Stilling well (local purchase)	2	1	1
3. Cableway - fixed installation			
Upright I-section universal steel winch posts, 4m	2	2	
Upright 2-inch diam. steel pole winch posts, 4m			2
Track cable, metres	69	69	58
Attachment unit for track cable	1	1	1
Tension device for track cable	1	1	1
Tow cable, metres	138	138	115
Tension jack for tow cable	1	1	1
Pulley block far side	1	1	1
4. Transport and construction costs			
Transport costs (airfreight)	1	1	1
Construction costs (local)	1	1	1
5. Portable cableway equipment			
Portable mechanical double winch with counter	1		
Portable crane trolley	1		
Co-axial suspension cable (for all sites), metres	84		
Connection cable winch to counter	1		
Accessories and tools	1		
Current meter, in instrument case	1		
Counter, output in m/s	1		
Sinker weight, 50 kg	1		
Panasonic Toughbook CF-19 Mark III With XP	1		
Battery, 12V 12Ah, rechargeable	9		
Battery charger	2		
Transport cost (airfreight)	1		
Chest waders	3		
6. Installation support and training, days	14	7	7

6 Budget costs

Table 5 lists unit costs of the station components. Budget unit costs are based on recent (2010) quotations from suppliers.

Table 5 Sub-watershed outlet stations – unit costs

Item	Unit Cost US\$
1. Access track	n/a
2. Water monitoring equipment (fixed installation)	
Staff gauges, D50	\$90
Pressure transducer	\$1,800
Turbidity monitoring sensor	\$4,695
Cable for turbidity sensor, per metre	\$21
Data logger for turbidity sensor	\$1,500
Enclosure, weatherproof to IP67, for data logger and	\$488
Enclosure, GRP, IP54 sealing, lockable	\$488
Stilling well (local purchase)	\$500
3. Cableway - fixed installation	
Upright I-section universal steel winch posts, 4m	\$900
Upright 2-inch diam. steel pole winch posts	\$300
Track cable, per metre	\$28
Attachment unit for track cable	\$1,290
Tension device for track cable	\$506
Tow cable, per metre	\$19
Tension jack for tow cable, each	\$128
Pulley block far side, each	\$5,130
4. Transport and construction costs	
Transport costs (airfreight), Lump sum	\$15,000
Station construction costs, local, per station	\$5,000
5. Portable cableway equipment	
Portable mechanical double winch with counter	\$24,000
Portable crane trolley	\$2,550
Co-axial suspension cable, per metre	\$28
Connection cable winch to counter, each	\$255
Accessories and tools	\$255
Current meter, in instrument case	\$4,500
Counter, output in m/s	\$2,100
Sinker weight, 50 kg	\$8,250
Panasonic Toughbook CF-19 Mark III With XP	\$4,208
Battery, 12V 12Ah, rechargeable	\$45
Battery charger	\$75
Transport cost (airfreight)	\$10,000
Chest waders	\$180
6. Installation support and training, per day	\$975

Table 6 lists total costs for each of the Baskura, Enkulal and Jema stations.

Table 6 Sub-watershed outlet stations – budget costs

Priority	1	2	3
Outlet	Baskura	Enkulal	Jema
Item			
1. Access track	\$79,000	\$227,000	\$361,000
Sub-total - Access track	\$79,000	\$227,000	\$361,000
2. Water monitoring equipment (fixed installation)			
Staff gauges, D50	\$900	\$900	\$450
Pressure transducer	\$1,800	\$1,800	\$1,800
Turbidity monitoring sensor	\$4,695	\$4,695	\$4,695
Cable for turbidity sensor, 30 metres	\$858	\$858	\$858
Data logger for turbidity sensor	\$1,500	\$1,500	\$1,500
Enclosure, weatherproof to IP67, for data logger and battery	\$488	\$488	\$488
Enclosure, GRP, IP54 sealing, lockable	\$488	\$488	\$488
Stilling well (local purchase)	\$500	\$500	\$500
3. Cableway - fixed installation			
Upright I-section universal steel winch posts, 4m	\$1,800	\$1,800	
Upright 2-inch diam. steel pole winch posts			\$600
Track cable	\$1,915	\$1,915	\$1,596
Attachment unit for track cable	\$1,290	\$1,290	\$1,290
Tension device for track cable	\$506	\$506	\$506
Tow cable	\$2,588	\$2,588	\$2,156
Tension jack for tow cable	\$128	\$128	\$128
Pulley block far side	\$5,130	\$5,130	\$5,130
4. Transport and construction costs			
Transport costs (airfreight)	\$15,000	\$15,000	\$15,000
Station construction costs, local, Lump sum	\$5,000	\$5,000	\$5,000
Sub-total - Cableway station installed	\$44,583	\$44,583	\$42,183
5. Portable cableway equipment (1 set only)			
Portable mechanical double winch with counter	\$24,000		
Portable crane trolley	\$2,550		
Co-axial suspension cable (for all sites)	\$2,331		
Connection cable winch to counter	\$255		
Accessories and tools	\$255		
Current meter, in instrument case	\$4,500		
Counter, output in m/s	\$2,100		
Sinker weight, 50 kg	\$8,250		
Panasonic Toughbook CF-19 Mark III With XP	\$4,208		
Battery, 12V 12Ah, rechargeable	\$405		
Battery charger	\$150		
Transport cost (airfreight)	\$10,000		
Chest waders	\$540		
Sub-total - Portable equipment	\$59,004		
6. Installation support and training	\$13,650	\$6,825	\$6,825
TOTAL	\$379,364	\$549,992	\$813,191

Table 7 lists summary costs

Table 7 Sub-watershed outlet stations – summary costs

Station	Access roads US\$	Cableway Station US\$	Portable equipment for all stations US\$	Tech support US\$	Total US\$
Baskura	\$79,000	\$44,583	\$59,544	\$13,650	\$196,777
Enkulal	\$227,000	\$44,583		\$6,825	\$278,408
Jema	\$361,000	\$42,183		\$6,825	\$410,008

Table 8 lists the overall cost of implementing Baskura alone, Baskura and Enkulal and finally Baskura, Enkulal and Jema.

Table 8 Sub-watershed outlets – combined costs

Stations	Total cost US\$
Baskura	\$196,777
Baskura and Enkulal	\$475,185
Baskura, Enkulal, Jema	\$885,193

References

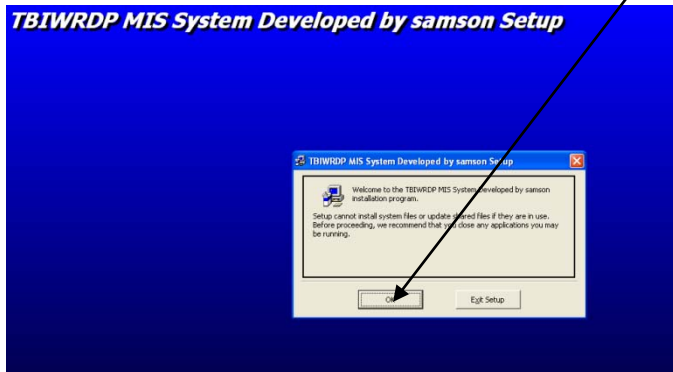
NIRAS (2010) Identification of TBIWRDP B1 sub-watershed hydrological monitoring sites, Progress Report. Tana-Beles WME Report No. 16. NIRAS.

Annex 4. Data Processing manual for Woreda Experts

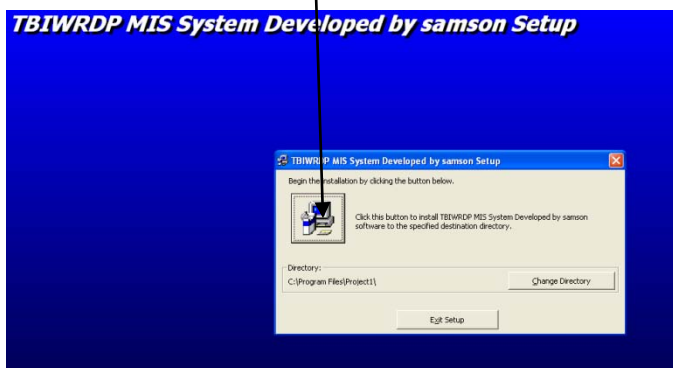
User Manual for Tana Beles MIS

The MIS system developed using MS Access as a database, Crystal report8 as a report designer and Visual studio 6 as a programming language. To start the system insert the CD in your computer and follow the following installation steps.

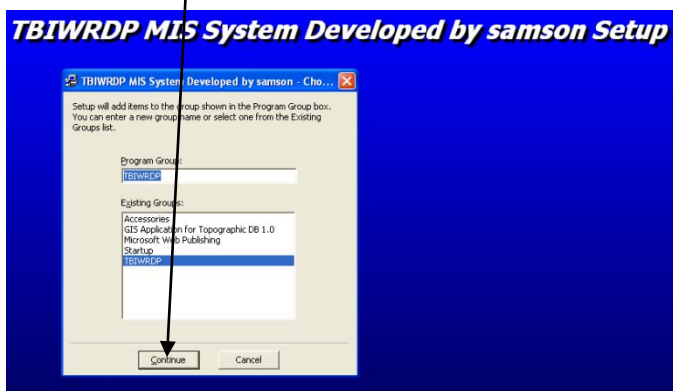
1. As you insert the CD the below installation window will appear on your computer. Click Ok



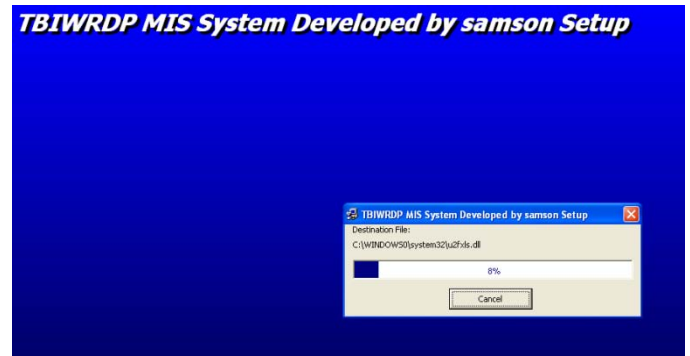
2. Click the big Install button



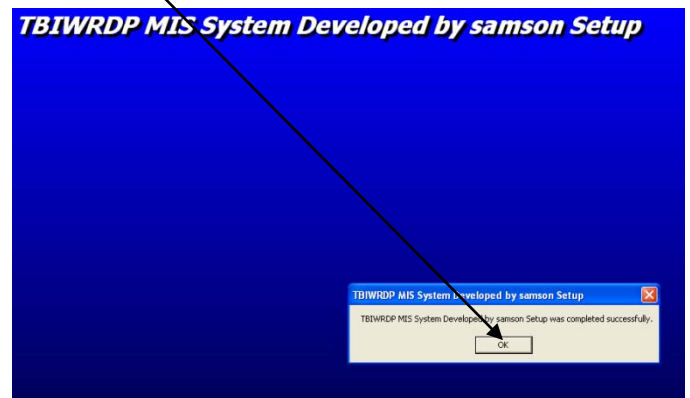
3. Click continue button



4. Wait until the progress bar finish the installation process



5. When the installation process finished, the message that shows successfully finished. Click Ok

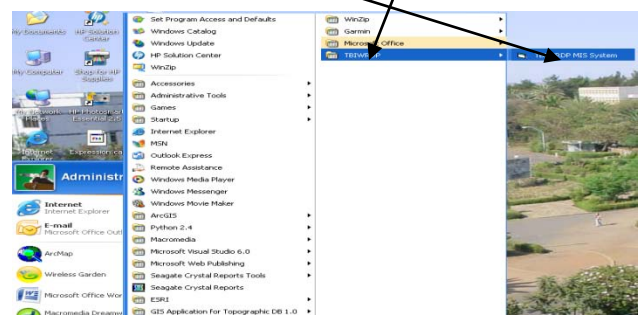


At this stage the installation of system on your computer is successfully. The next step is to copy the folder that contain the necessary database and GIS shape files.

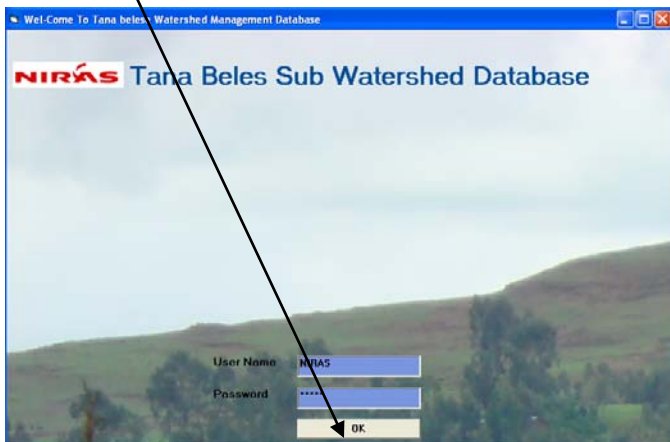
Copy "NIRAS\MISdata" Folder from your CD to C: drive on your computer.

By this time you are ready to use the application for your data entry.

6. Click Start and point to TBIWRDP and click TBIWRDP MIS System.



- The welcome window appears, Enter the appropriate Username and Password and click Ok



- The geographic location and current condition of the project area window appear. From this window you can get other eight windows that perform different tasks.



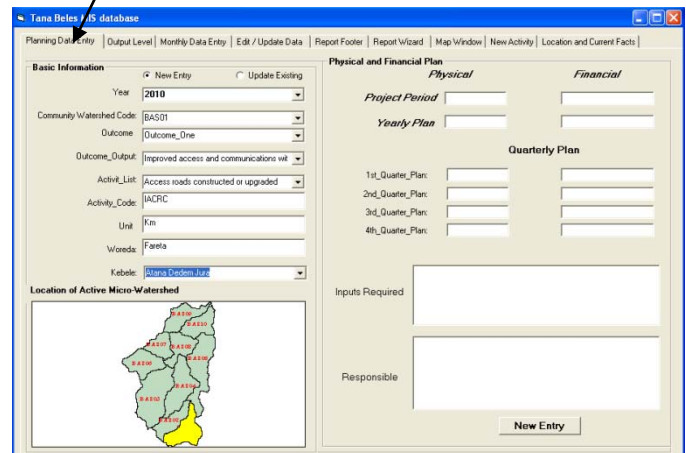
- Planning window:- use to enter new or update project time, yearly and quarterly plan of each community watershed.
- Output level Indicators:- use to enter project time and yearly output level planning and also to enter quarterly achievement of each community watershed.
- Monthly Data Entry window:- uses to enter monthly activities of each community watersheds.
- Monthly Data Editing window:- uses to edit or update monthly data of each community watershed.
- Report footer window:- uses to enter narrative report as a footer on the main report.

- Report wizard:- uses to generate report in different time and level.
- Map display window:- uses to display GIS files.
- New Activity window:- uses to add new activities in the community watershed.

Application of each window

9. Planning Data Entry

Click on Planning Data Entry Tab, the planning data entry interface will appear.



On this window you have two options one to enter new planning and the second to edit or update the existing planning data. The button on the bottom of the window changes from “New Entry” to “Update” as you shift from “New Entry” to “Update Existing”

If you want to enter new palling data use the default option “New Entry” .

N.B The Tana Beles MIS system is developed to report activities implementation in different level and time, such as Community watershed, kebele, woreda and regional level and also in different time period monthly, quarterly and yearly.

Therefore, before entering any planning and implementation data you should select

- Time /year/
- Community watershed code/name/
- Outcome level indicator
- Output level indicator
- Activities
- Kebele

Activity code, unit and woreda will be given by the system.

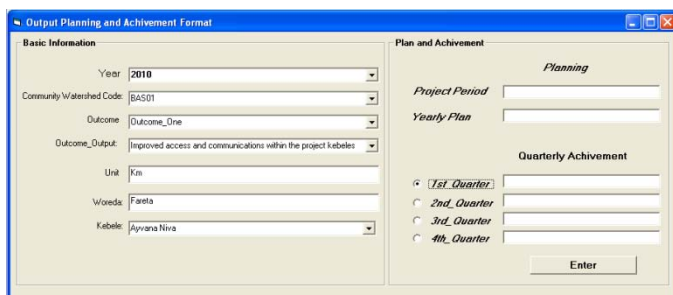
On planning window fill up the “Basic information” block by selecting from the combo box. And start entering the project time, yearly and quarterly planning data. In this window you also can fill up the input required and the responsible person for each activity in each community watershed.

Finally click on “New Entry” Button.

In case of update, when you fill up the “Basic Information” Block the selected activity planning data will be displayed on the corresponding time. Your task is to change/update/ the old data by the new one and click the “Update” button.

Updating of planning is only possible after approval of the woreda string committee and RPCU. This updated plan will be functional for the next month achievements not for the passed months

10. Output Level Data Entry

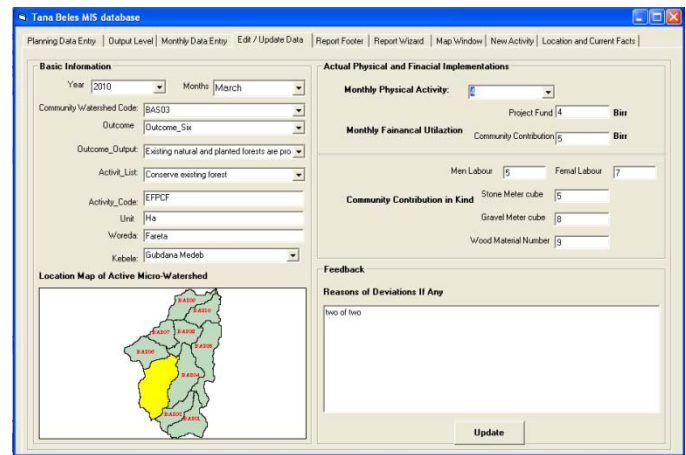


This format helps to enter output level Planning data for project time and yearly base and also use to enter quarterly achievement data in output level.

Like other data entry format first fill the necessary information in “Basic Information” column then enter the planning data, if you are in planning phase, otherwise enter quarterly achievements and click “Enter” Button to add your data in the database.

11. Monthly Data Entry

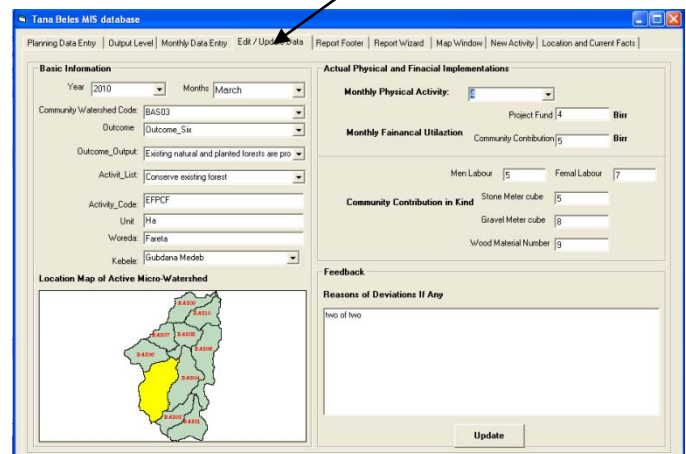
Click on Monthly Data Entry Tab



Like the planning data entry fill all the necessary “Basic information” and enter the monthly achievements for each activities for each community watershed. In this window you should fill the financial performance both from project fund and community contribution. Under community contribution in kind box you should enter each contribution such as collected stones in meter cub, gravel in meter cub and wood in number and the monitory conversion is filled in financial contribution text box. In the reason for division text box write the reason why the achievement is less from the planned. This box is active only in quarter months; it is not active for the rest. Finally click on “Enter” Button. The data you filled out is stored on the database, and then continue for the next activity within the community watershed. When you finished one community watershed, then change the community watershed code and continue the previous steps.

12. Monthly Data Update

To get this window click on the “Edit/ Update Data” Tab from any window.



This window uses to edit any incorrect monthly data entered to the database. You can Edit/update data if you or any data user discovers the data inconsistency between different levels or typing error.

Here also, first fill all the necessary basic information for the to be updated data. As you fill the information in the basic information column, the system displays the previously entered data for that specific activity, and then changes the old data with the new one and click “Update” button.

13. Report Footer

To open the report footer window click on the “Report Footer” tab.

This window must be used always before generating any report b/c it helps to add narrative information for the report as report footer. In this window we can:

- Add Narrative report for each output or indicators /explain their status/
- Challenge encounter and measures taken to resolve the problem
- Lessons learned/best practice gained

After entering the above information click “Add to Report” button.

14. Report Wizard

To open the report wizard click on “Report Wizard” button.

This window has different options. The option helps to:

- Select the time frame i.e to select yearly, quarterly and monthly report.
- Select aggregation level i.e community watershed, klebele, or woreda report.
- To select the outcome, output or activity level report.

After filling all the necessary information click “Generate Report” button.

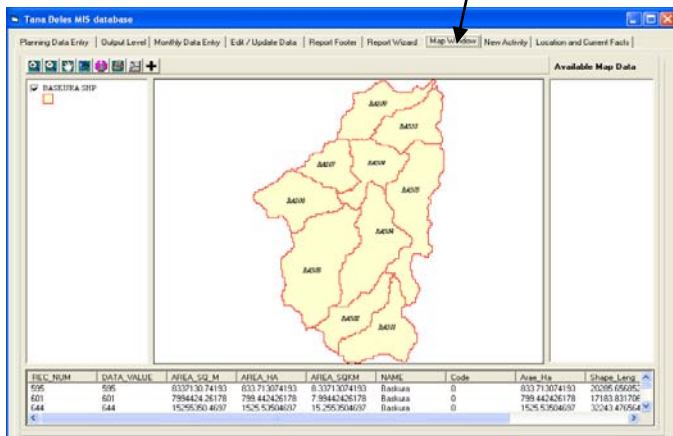
For example if you want to generate a 2nd quarter report for BAS01 community watershed for undertake gully treatment or rehabilitation output, follow the following steps:

- Select the “Quarter report” radio button
- Select year from year from the first combo box
- Select 2nd quarter from the quarter list combo box
- Select financial or physical radio button
- Select “BAS01” form the community watershed combo box
- Select “gully treatment or rehabilitation” from the List of output combo box.
- Lastly click “Generate Report” button

N.B the worda level report will be produced if you click “Generate Report” button without selecting administrative and Watershed boundary options and Activity Level options.

15. Map Window

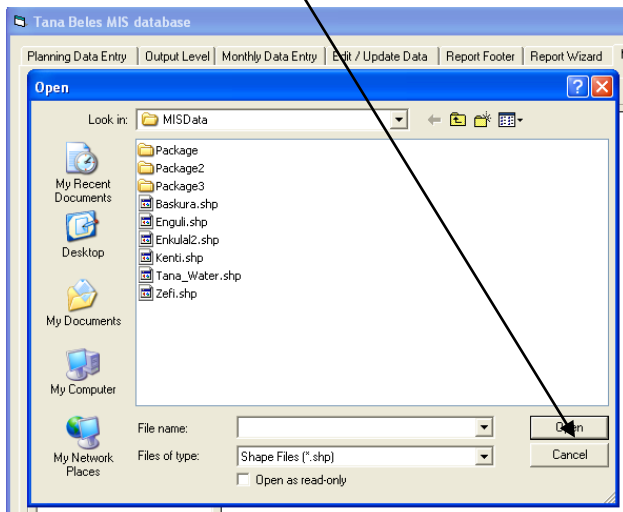
To open the Map window click on “Map Window” button.



This map window use to display GIS file of the project area. The window has ability to:

- Zoom in and Zoom out
- Pan
- Full extent
- Identify
- Print and
- Add data
- Display the descriptive information of the displayed map.

To add data on the window click “+” sign button, the open dialog box will display then select one or many map data and click “Open” button from the dialog box.

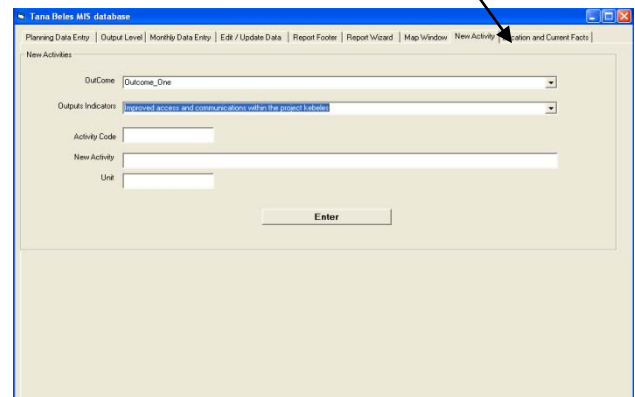


The selected map will be displayed on the map window and the descriptive information about the most top

data can be displayed in the bottom of the map window.

16. New Activity

To open this window click on “New Activity” tab



This window helps to add new activity list which is not in the activity list box. To add new activity first you should now under which outcome and output this activity will belong, then select the outcome and output and type the name, activity and unit of the new activity and finally click “Enter” button.

Your new activity will be added to your existing activity, so you can use to add your monthly achievements and planning data.

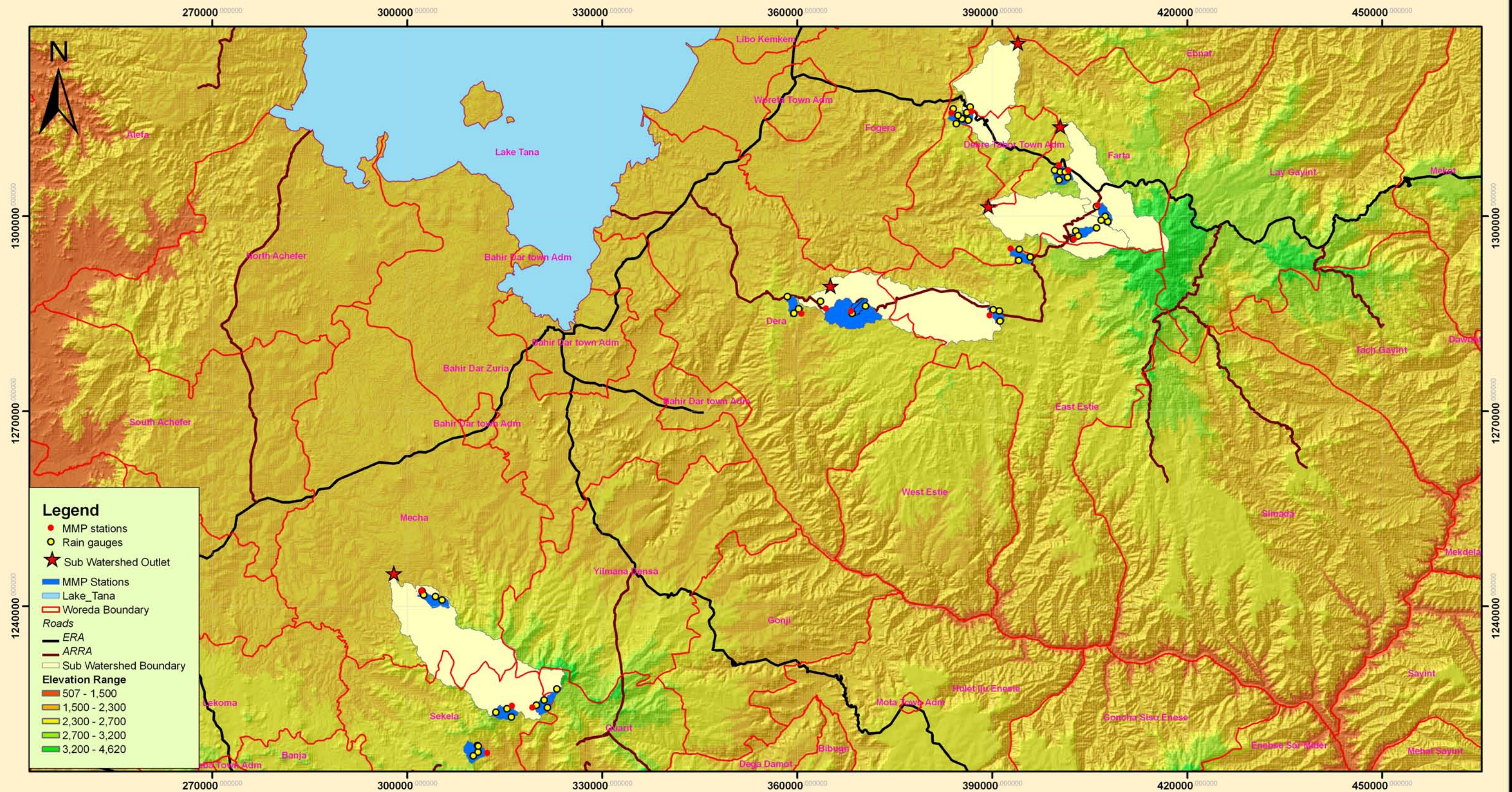
17. Location and Current facts

To open this window click on “Location and current Fact” tab



This window shows the administrative boundary of Amhara region, the geographic location of the Tana Beles sub watersheds. The window also shows photos of the current situation with the sub watersheds.

Annex 5. Map of additional rain gauges in MMP watersheds



Map of Hydrological Monitoring Sites in Tana Beles Sub Watersheds





Tana-Beles WME Reports

- No 01. Tana-Beles WME Project Document. July 2009. 135 p.
- No 02. Monthly Report for June 2009. 8 p.
- No 03. Monthly Report for July 2009. 9 p.
- No 04. Inception Report for project initiation period 1.6.-31.7.2009. 38 p.
- No 05. Monthly Report for August 2009. 33 p.
- No 06. Quarterly Report for period 1.6.2009 – 30.9.2009. 30 p.
- No 07. Monthly Report for October 2009. 22 p.
- No 08. Monthly Report for November 2009. 10 p.
- No 09. Annual Report for 2009. 60 p.
- No 10. Data Quality Assessment Guideline. January 2010. 26 p.
- No 11. Sensitization and Awareness Raising Strategy. January 2010. 24 p.
- No 12. Monitoring & Evaluation for Watershed Development B1. Short-term Consultancy Report. January 2010. 95 p.
- No 13. Monthly Report for January 2010. 39 p.
- No 14. Hydrology monitoring for Watershed Development B1. Short-term Consultancy Report 1. February 2010. 102 p.
- No 15. Monthly Report for February 2010. 38 p.
- No 16. Identification of TBIWRDP B1 sub-watershed hydrological monitoring sites. Progress Report. February 2010. 22 p.
- No 17. Quarterly Report for period 1.1.2010 – 31.3.2010. 74 p.
- No 18. Monthly Report for April 2010. 29 p.
- No 19. Monthly Report for May 2010. 14 p.
- No 20. Microwatershed Monitoring Programme. Baseline Report 21 July 2010. 69 p.
- No 21. Quarterly Report for period 1.4.2010 – 30.6.2010. 38 p.
- No 22. Zefie community watershed model development plan. March 2010. 99 p.
- No 23. Monthly Report for July 2010. 15 p.
- No 24. Access Roads to five hydrological stations. Short-term Consultancy Report. 114 p.
- No 25. Monthly Report for August 2010.
- No 26. Process Monitoring. Short-term Consultancy Report. 33 p.
- No 27. Hydrology monitoring for Watershed Development B1. Short-term Consultancy Report 2. September 2010.
- No 28. Quarterly Report for period 1.7.2010 – 30.9.2010.

The reports can be downloaded (as pdf-files) in

<http://tana-beleswme.org/>